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Low Cost Production of Small Parts by Precision Casting

Cutting Operating Costs by Normalizing Gas Cylinders

Producing Stainless Powder Parts In Wide Range of Shapes

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 125, NO. 25 DECEMBER 19, 1949

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AFTERMATH OF THE STEEL STRIKE

DEPENDABLE DAN
OUR CUSTOMERS' MAN

OUR first concern, during the steel strike, was to help our cus tomers keep their plants running. So with everything going ou and practically nothing coming in, we all but exhausted our mil and warehouse inventories.

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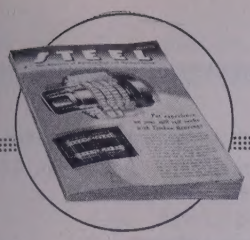

December 19, 1949

A Simple Way

An encouraging sign of the times is the rising tide of interest manifested in many quarters in organizing a campaign against further encroachment by the federal government upon the freedoms of the people. Raymond Moley, in a recent issue of "Newsweek," discussed the problem substantially as follows:

If all those who do not favor the Truman program could be mobilized in opposition there is good reason to believe that the program would be rejected decisively. The job of mobilization is beyond the ability of the Republican party. Outside the party there should be developed an organization of wage earners, farmers, lawyers, doctors, engineers, industrialists, merchants and others—regardless of party—who naturally are opposed to a socialistic state. This body would not be exactly a right-wing version of the left-wing Americans for Democratic Action and the Political Action Committee of CIO, but its work could do much to offset the influence of these groups. The proposed body would not aspire to become a political party, nor would it nominate candidates. It would concern itself primarily with the creation and propagation of a sound political program and with the enlistment of national support for it at elections.

Millions of Americans who are utterly disgusted with the present dangerous trend toward socialism probably will applaud the organization of a movement along the lines outlined by Mr. Moley. A properly directed campaign undoubtedly would produce gratifying results.

But whether or not such a body is organized, there is another way—a simple way—in which opposition to the socialistic state can be mobilized effectively. Here it is, in brief:

Enlist the co-operation of every existing manufacturers', industrial, trade, employers' or similar association, all professional societies, all chambers of commerce and all kindred organizations in individual campaigns to urge each member to do two things: 1. Register if he is not registered. 2 Vote in every election.

Today less than 80 per cent in these groups are registered and perhaps fewer than 55 per cent vote. If the campaign succeeded in raising these percentages to say 95 and 75, respectively, the proportion of new votes that would be cast against socialism would be sufficient to win elections and to thus preserve freedom for Americans.

* * *

RAISES STEEL PRICES: A general increase in finished steel prices has arrived sooner than had been expected. United States Steel Corp. took the initiative by announcing adjustments effective Dec. 16. Corporation officials estimate that the average increase is about $4 per ton, of which $2 is in base prices and $2 in extras.

Reasons for the increases are actual and approaching increases in production costs. These include freight rates, iron ore prices and cost of the recently negotiated insurance and pension programs. However, not all of the price adjustments are upward. For instance, the price of tin plate will be lowered, effective Jan. 1, to reflect declines in the price of tin.

Consumers should not be guided too much by the average increase of $4 per ton. The price changes on individual products vary widely, from reductions in some instances to increases as much as double the average on some items. Some of the adjustments in extras are the result of studies made months ago to bring extras more in line with current conditions.

(OVER)

AS THE EDITOR VIEWS THE NEWS

Last week's price revision was the first of general character since July and August in 1948. It will take time to determine the impact of the new prices upon the costs of fabricators and manufacturers. Even a cursory glance at the new quotations indicates that consumers in some industries will be hit much harder than those in other lines. —pp. 45, 121

* * *

IN MEMORY OF SCHWAB: That picture of steel company executives taken in the lobby of Bethlehem Steel's general offices following the dedication of the Charles M. Schwab Memorial Library is likely to become a cherished print of unusual significance. Appearing in it are the chief executives of 22 of the leading steel companies. Seldom has a memorial event commanded the respectful attendance of such an impressive representation of the leadership of a single industry.

The late Mr. Schwab was a persistent optimist. Occasional periods of depression never weakened his faith in the belief that in the long run the American steel industry was destined to become bigger and better. If he could have witnessed the dedication of the library established in his memory, he would have been elated but not surprised by the fact that the annual steel ingot capacity represented by the board chairmen and presidents attending the ceremony in 1949 exceeded by more than 3 million tons the total capacity of the entire industry in 1939, the year in which he departed from this world. —p. 55

* * *

TRI-FOLD ACHIEVEMENT: Occasionally a company, faced with the need of adding new facilities, has the vision, courage and resources to break away from orthodox ideas and to strike out along new lines. Scovill Mfg. Co. did this in designing and constructing its new continuous strip mill at Waterbury, Conn.

This noteworthy project embraces a unique casting machine which continuously casts rectangular-section brass bars 2½ x 24 inches by 10 feet long, new rolling mill equipment and complementary annealing, pickling, cleaning, inspection, slitting and packaging facilities. The investment of more than $10 million enables Scovill to produce and market the heaviest cold-rolled and nonweldable brass coils available from the industry.

Important also is the fact that the new technique removes much of the drudgery of traditional brass rolling operations. To improve working conditions at the same time the range of product is expanded and its quality improved is a commendable achievement. —p. 74

* * *

NEW HOPE IN GERMANY: Out of the desolation of war-ruined Western Germany is arising speculation as to whether or not the 50 million people and the industrial plant and equipment in that area could be made the basis for a mass production economy patterned after the American model.

For many decades pre-Hitler Germany developed her industries to a point of efficiency far surpassing that of many of her European neighbors. The big trouble was that the demands of militarism prevented the nation from reaping the full rewards of its industrial performance in terms of more goods at less cost for more people.

Now that the three western zones are emerging from despair, talk centers more and more upon the kind of economy that will be most beneficial. German know-how could be adapted easily to the mass production idea, or to a modified version of it. The progress of thinking along these lines will bear watching. It could solve a number of vexing problems. —p. 57

* * *

FIGHT AREA PENSIONS: Toledo is the scene of an important contest in connection with pensions for employees of industrial companies in and near that city. United Auto Workers-CIO is demanding an "area pension plan." It proposes that each of the 125 companies in the area contribute $125 per employee to initiate the plan and 10 cents per hour per employee to maintain it. Employers, while not averse to sound pensions, have organized to resist the CIO regional plan. Their "Committee To Save Toledo's Payrolls" is launching a long-term campaign to clarify the area's community labor situation.

The outcome in Toledo will be important to many industrial companies throughout the nation. No regional plan should be even considered anywhere until the confusion arising from existing too-hastily negotiated plans has been cleared away. —p. 47

Merry Christmas!

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

STEEL PRICES RISE—U. S. Steel Corp. raised its prices effective Dec. 16 (p. 45). Although there are a few decreases—as in tin plate—the net effect is a $2 per ton boost on base quotations and a $2 per ton hike on extras. Other major producers will undoubtedly follow U. S. Steel's lead. Several smaller companies raised their quotations even before the corporation did.

MISSION ACCOMPLISHED—In spite of the steel and ore mine strikes (p. 46), the Great Lakes fleet did its duty in 1949. More than 69.5 million gross tons of ore were hauled on the lakes in the past year. Although this is nearly 13.4 million tons less than last year, this winter's stockpile at steel mills and lower lake ports is 3 million tons ahead of 1948.

TOLEDO PLAN—If you've got labor troubles, consider the problems facing Toledo businessmen (p. 47). They are organizing to fight the "Toledo Plan" presented by Richard T. Gosser, regional vice president of the United Auto Workers-CIO. He says 125 industries in Toledo and the surrounding area will be asked to sign agreements for an area pension plan with a common fund and to be administered by a board of local trustees. An employer would ante $125 at the start for each of his workers and then contribute 10 cents an hour for each worker. Mr. Gosser threatens to strike any plant that won't co-operate. Opposing the idea, besides industrialists, are civic leaders.

CAPITAL OUTLAYS—Look for a 14 per cent decrease in expenditures for new plant and equipment in the first 1950 quarter, compared with the same 1949 period (p. 49). The government estimates about $3.8 billion will be spent in the next three months. About $17.9 billion will be spent in 1949, compared with $19.2 billion in 1948.

STEEL EXPANSION—Bolstering the new plant and equipment expenditures this year and next are several steel expansions (p. 48). Lone Star Steel Co. will build a $1 million cast iron pressure pipe plant and a $52.5 million steel mill. Colorado Fuel & Iron Corp. will improve its Pueblo, Colo., plant with a new rail slitting and rerolling mill and other facilities. Cost will range from $2.5 million to $3 million. Joseph T. Ryerson & Son Inc. has completed an addition to its Chicago steel-service plant. Jessop Steel Co. wants a $1.3 million loan from the RFC to expand its Washington, Pa., plant.

TRUST BUSTING—Don't expect any retreat in the government's campaign to break up big business (p. 52). The administration's "positive program" to unify antitrust procedure and keep businessmen informed on what is legal and what isn't has a familiar ring. It has come up ever since Herbert Hoover as secretary of commerce in the 1920s tried to get some unified policy. The present secretary, Charles Sawyer, is just as sincere in his efforts, but business in Washington is like a girl in cotton stockings among nylon-clad women.

FOREIGN—Britain is bracing herself for the next general elections which will decide whether the people approve of Labor's diagnosis and prescriptions for the nation's ills (p. 56). Western Germany has a potentially strong domestic market of 50 million people who may support a mass production economy similar to America's (p. 57).

HERE AND THERE IN INDUSTRY—The Timken Roller Bearing Co. strike is ended (p. 48) . . . Studebaker Corp. will introduce its new automatic transmission after the first of the year (p. 59) . . . Weirton Steel Co. has installed a "rubber railroad" built by Goodyear Tire & Rubber Co. to haul coal 10,900 ft (p. 51) . . . Business loan losses of the RFC average only 0.75 per cent (p. 54) . . . Sales of Lombard Corp. in 1950 should exceed $2.5 million (p. 51). . . . Burroughs Adding Machine Co. has a new laboratory for the study of ways to eliminate radio interference caused by electrical equipment and devices (p. 62).

Can you hear between the notes?

In the hush of Christmas Eve children sing—their reverent voices joyful as they rise and fall with the lamplit notes before their eyes. . . . And if you listen—listen with your mind—you can hear a song *within* their song, the mighty chorus of industry and enterprise that lends our nation's Christmas carols an added theme of thankfulness. . . . In their tiny, tuneful way these carolers remind us of our greatest blessing—the right to share in the American miracle of fruitfulness and freedom. And so we too pause to express our joy and thankfulness for friends and country that make this miracle a reality.

RYERSON STEEL

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STEEL
A PENTON PUBLICATION

teel Price Increase Averages $4

Extra charges brought into line with modern production practices; some increased and some decreased. Tin plate prices reduced. Stainless steel prices and extras unchanged

ETALWORKING companies will ay an average of 4 per cent more or steel as result of adjustments in ase prices and extra charges.

U. S. Steel estimates its increase ill average $4 a ton—$2 for adjustents in base prices and $2 for reisions in extras.

Costs to individual companies will ary widely from this average deending on the steel products they se.

Costs Dictate Increase—The upward djustments in steel prices are attributed to increases in production costs, actual and approaching. Most steel companies will start paying into insurance and pension funds the first of the year.

Freight rates, iron ore prices and other production costs for steelmakers also have increased since the last general price adjustments were made in July and August of 1948.

U. S. Steel Takes Lead — First among the big steel producers to revise prices was U. S. Steel, whose new quotations became effective Dec. 16 on all products except tin plate. On tin plate the price will drop Jan. 1. Other major steel producers are expected to follow the lead of Big Steel.

Extras Modernized—The revisions in extras now being studied by metalworking executives are the result of a thorough study of such charges started last spring. Steelmakers long have complained that many of the extra charges applying to steel products are obsolete. Many grew out of the hand mill age. Thus premiums were paid for wide sheets, which are the easiest to roll on the big continuous mills.

The new extra and deduction structure, steelmen say, brings these charges into line with today's practices.

Tin Plate Drops—Not all prices increased. Tin plate is reduced about 15 cents a base box, or $3.30 a ton, effective Jan. 1 for all of 1950. The reduction is made possible by recent reductions in the price of tin.

Mill prices for stainless steel products and extras on stainless products are not changed by U. S. Steel.

Sees Stability—Says Ben Fairless, U. S. Steel president: "We are hopeful that by now naming prices for our steel products which have a proper relationship to costs and profit margin, and on all sizes, gages and finishes of these products, we will minimize so far as possible further fluctuations in our prices, at least for the foreseeable future, to the end that our customers and our subsidiaries may base their planning on a sound and realistic foundation."

Reaction — Metalworking executives greeted the announcement of steel price revisions calmly. They have realized for weeks that the heavy cost of pensions and social insurance, plus increases in freight and raw material costs, would necessitate upward adjustments.

Some labor leaders and some congressmen protested the price increases on the basis of recent profit showings by the steel producers.

The new prices as announced by U. S. Steel subsidiaries are:

CARNEGIE-ILLINOIS STEEL CORP.

Carbon Steel

(Cents per lb except where otherwise noted)

	(Per Net Ton)	(Inc.)
Blooms, billets & slabs (forging quality)	$63.00	$2.00
Blooms, billets & slabs (rerolling quality)	$53.00	$1.00
	(Per 100 lb)	(Inc.)
Skelp	$ 3.15	$0.10*
Bars and bar shapes	3.45	0.10
Plates	3.50	0.10
CB section	3.40	0.20
Standard structurals	3.40	0.15
Reinforcing bars (new billet)	3.45	0.10
Bearing piles (CBP sections)	2.40	0.20
Sheet piling	4.20	0.15
Standard tee rails:		
No. 1 O.H.	3.40	0.20
No. 2 O.H.	3.30	0.20
All No. 2 O.H.	3.35	0.20
Light rails	3.75	0.20
Joint bars for standard rails	4.40	0.15
Tie plates	4.20	0.15
Axles	5.25	0.05
Sheets:		
Hot-rolled, 18 ga. & hvr.	3.35	0.10
Cold-rolled, commercial quality	4.10	0.10
Silicon sheet (electric grade) 22 ga.	6.95	...
(Silicon sheets increased an average of $25.00 a ton in base price and $4.50 on extras)		
Corrugated galv. culvert sheets, 16 ga. 24" to 30" wide		
Copper bearing	5.20	0.20
Pure Iron	5.45	0.10
Copper bearing pure iron	5.45	0.10

* Reduction.

High Strength Steel

Corten

	(Per 100 lb)	(Inc.)
Bars & small shapes	$5.20	$0.10
Plates	5.35	0.15
CB sections	5.10	0.15
Standard structurals	5.15	0.20
Sheets:		
Hot-rolled	5.05	0.10
Cold-rolled	6.20	0.15

Man-Ten

	(Per 100 lb)	(Inc.)
Bars & small shapes	$ 4.25	$0.10
Plates	4.55	0.10
CB sections	4.40	0.20
Standard structurals	4.35	0.15
Sheets:		
Hot-rolled	4.20	0.10

Abrasion Resisting

Plates	4.65	0.10
Bars & bar shapes	4.60	0.10
Sheets, hot-rolled	4.50	0.10

Alloy

Hot-rolled bars	3.95	0.20
Bar shapes	4.20	0.20

AMERICAN STEEL & WIRE CO.

	(Per 100 lb)	(Inc.)
Wire rods, carbon:		
Donora, Cleveland, Joliet	$ 3.85	$0.45
Worcester	4.15	0.45
Strip, C. R. carbon:		
Cleveland	4.15	0.15
New Haven	4.65	0.15
Wire, mfrs. bright, low carbon:		
Donora, Cleveland, Joliet, Waukegan, Duluth, Rankin	4.50	0.35
Worcester	4.80	0.35
Wire, spring, high-carbon:		
Donora, Cleve., Duluth, Waukegan	5.55	0.35
Worcester, Trenton, New Haven	5.85	0.35
Nails and staples:		
Donora, Joliet, Rankin, Duluth	Col. 106	3
Worcester	Col. 112	3

(*Please turn to Page* 132)

STEEL GOES UP!

Here are the adjustments in base prices of carbon steel products and average increases for extras by production classifications. Price and extra changes quoted on net ton basis. Asterisk denotes reduction.

Products	Base Prices	Extras (Avg.)
Forging Ingots	...	$1.00
Forging Blooms, Billets, Slabs	$2	1.00
Rerolling Blooms, Billets, Slabs	1	0.50
Skelp	2*	5.00
Hot-Rolled Bars	2	3.50
Reinf. Bars	2	1.50
Structural Shapes	3	1.50
CB Sections	4	.50
Plates	2	2.00
Axles	1	2.00
Light Rails	4	.50
Hot-Rolled Strip	...	8.50
Hot-Rolled Sheets	2	4.00
Cold-Rolled Sheets	2	4.00
Galvanized Sheets	...	6.00
Long Terne Sheets	...	15.00
Wire	7	.50
Average, All Products	$2	$2.00

Mission Performed

Despite steel and ore strikes, 69,556,269 gross tons of ore were hauled on lakes

THE GREAT LAKES fleet performed its ore mission in 1949 despite the steel and mine strikes.

The Lake Superior Iron Ore Association reports that 69,556,269 gross tons of ore were hauled on the lakes in the past year. Although this is 13,380,923 tons less than last year, this winter's stockpile at steel mills and lower lake ports is 3 million tons ahead of 1948. That should carry the mills through until navigation opens in 1950. The ore freighters hauled 170,720 tons in December before they were berthed for the winter.

The Lake Carriers' Association says that limestone schedules are pretty well completed. Grain movement this year is even better than last year's haul. Only in coal did the fleet have unfinished business. As of Dec. 1, 33,954,770 net tons were moved, 19 million tons below 1948. Some freighters won't tie up until after midmonth. They are taking advantage of special insurance coverage for this emergency to haul coal.

Here are gross tonnage shipments of iron ore since 1940, as compiled by Lake Superior Iron Ore Association:

1947	77,898,087	1943	84,404,852
1946	59,356,716	1942	92,076,781
1945	75,714,750	1941	80,116,360
1944	81,170,538	1940	63,712,982

Steelmaking Recovery Rapid

STEEL production staged a rapid recovery in November but fell well below the average for the first three-quarters of the year. American Iron & Steel Institute says output of ingots and steel for castings was 4,145,294 tons in November, compared with the revised figure of 926,082 tons in October and 7,797,558 in November, 1948.

Aggregate output for the first 11 months of 1948 is 70,080,776 tons or nearly 10,779,000 tons less than in the like 1948 period. Most of this decrease is due to the steel strike in October and early November. Production averaged over 7.2 million tons monthly for the first three-quarters of this year.

Operating rate in November was 52.4 per cent of capacity.

Manganese Oxide from Oregon

MANGANESE concentrates and oxides from low-grade ores will be soon produced domestically at Salem, Oreg. The steel industry needs manganese, but thus far has been forced to rely for much of its supply on uncertain deliveries of high-grade foreign ores.

Manganese Products Inc. says its production peak is scheduled for early in 1950 at the alumina plant government-built for $5.5 million but which it bought from WAA for $750,000. The company has a federal contract to produce the concentrates and oxide.

Metal Research Associates Form

METAL RESEARCH Associates, Cleveland, has been established to supply consulting and research capacity to metallurgical and related industries.

The company has a small staff working on problems for some of the nation's leading industrial firms. In its Cleveland laboratories is equipment for nonferrous melting, for almost all types of heat and heat surfacing treatments and for most common forms of metallurgical testing metallographic inspection and x-ray diffraction.

Associated with the firm are:

Dr. George Sachs, known for his extensive work in light alloys and extrusion, wire drawing and sheet forming. He was the founder-director of the Laboratory for Mechanical Metallurgy at Case Institute of Technology, Cleveland.

Dr. Harry Croft, who was director of research for the midwest division of Chase Brass & Copper Co. Inc. A trustee of the American Society for Metals, Dr. Croft is a part-time consultant with Metals Research.

Lee Wilson, known in the basic ferrous industry as developer of the radiant tube method of heating. He is founder-chairman of Lee Wilson Engineering Co. Inc., Cleveland, designers and builders of industrial furnaces.

George Epsey, who was senior research assistant to Dr. Sachs at Case. He has been metallurgist at Lee Wilson Engineering since the war.

C. F. Prutton & Associates, chemical research cosultant firm in Cleveland, is making a staff and facilities available for chemical phases of research.

FTC Still Stymied in Steel Case

THE NEXT development in the Federal Trade Commission's steel pricing case will be the FTC decision which will be delayed until appointment of the board's fifth member. The four present members are now deadlocked on the matter (See STEEL, Dec. 12, p. 55). Two are for and two against a compromise proposed by the steel industry.

All statements in the case are now filed. One is a memorandum by steel industry lawyers answering the objections to the compromise made by Richard P. Whiteley, the FTC's chief trial counsel. He holds that the commission has no power to issue cease and desist orders without findings of fact upon consent of respondents and that issuance of such a consent order would not be in the public interest.

Steel lawyers deny this. They say that the legislative history of Section 5b of the Administrative Procedure Act makes clear that Congress intended to encourage the disposition of such cases by informal settlements without findings of fact. They criticized Mr. Whiteley's objections as the equivalent of a philosophy that all controversies involving legal rights must be litigated through adversary proceedings to the bitter end.

Steel Ingot Production Statistics

	Estimated Production—All Companies									
	Open Hearth		Bessemer		Electric		Total		Calculated weekly production Net tons	Number of weeks in mo.
	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.	Net tons	Per Cent of capac.		
1949										
Jan.	7,287,683	101.1	408,552	92.6	487,260	93.8	8,183,495	100.2	1,847,290	4.43
Feb.	6,633,779	102.0	379,698	95.3	467,247	99.6	7,480,724	101.4	1,870,181	4.00
Mar.	7,473,901	103.7	430,176	97.5	483,850	93.2	8,387,927	102.7	1,893,437	4.43
1st qtr.	21,395,363	102.3	1,218,426	95.2	1,438,357	95.4	24,052,146	101.5	1,870,307	12.86
Apr.	7,015,611	100.5	404,095	94.6	365,570	72.7	7,785,276	98.4	1,814,750	4.29
May	6,889,230	95.6	400,741	90.9	299,751	57.7	7,589,722	92.9	1,713,256	4.43
June	5,954,619	85.3	349,196	81.8	194,386	38.6	6,498,201	82.2	1,514,732	4.29
2nd qtr.	19,859,460	93.8	1,154,032	89.1	859,707	56.4	21,873,199	91.2	1,681,260	13.01
1st 6 mos.	41,254,823	98.0	2,372,458	92.1	2,298,064	75.8	45,925,345	96.3	1,775,236	25.87
July	5,307,471	73.8	300,236	68.2	171,415	33.1	5,779,122	70.9	1,307,494	4.42
Aug.	6,101,499	84.7	355,335	80.6	257,910	49.7	6,714,744	82.2	1,515,744	4.43
*Sept.	5,992,306	86.1	350,282	82.2	247,601	49.3	6,590,189	83.5	1,539,764	4.28
*3rd qtr.	17,401,276	81.5	1,005,853	76.9	676,926	44.0	19,084,055	78.8	1,453,470	13.13
*9 mos.	58,656,099	92.5	3,378,311	87.0	2,974,990	65.1	65,009,400	90.4	1,666,908	39.00
*Oct.	814,374	11.4	.....	...	111,708	21.5	926,082	11.3	209,048	4.43
†Nov.	3,754,982	53.8	172,270	40.3	218,042	43.4	4,145,294	52.4	966,269	4.29

* Revised. † Preliminary figures subject to revision.
For 1949, percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of Jan. 1, 1949, as follows: Open hearth 84,817,040 net tons, bessemer 5,191,000 net tons, electric 6,112,890 net tons, total 96,120,930.

New Toledo Plan: Area Pensions

Northwestern Ohio industrialists resist move by UAW-CIO to impose regional retirement plan. Contend union proposal would mean bankruptcy for many smaller companies

TOLEDO is a city of unique labor problems. In the 1930s it attracted national attention with its "Toledo Plan" when an industrial peace board was set up following a series of bitter strikes. Today there is a new "Toledo Plan."

On Oct. 1, Richard T. Gosser, regional vice president of the United Auto Workers-CIO announced that 125 industries in Toledo and surrounding area would be asked to sign agreements for an area pension plan, with a common fund and to be administered by a board of local trustees. The board would be composed of seven men from industry, seven from labor, and a deciding neutral.

Initiation Fee—To get the plan started, each employer would be asked to ante $125 for each of his workers. This would raise about $6 million. To support the plan, each employer would contribute 10 cents an hour for each worker, increasing the plan's income by about $9.6 million yearly, on the basis of the 48,000 workers employed by 125 industries.

Strikes Threatened—In announcing his plan, Mr. Gosser coupled it with the statement that "we shall not hesitate to strike any plant that refuses to co-operate," and other statements that in striking he "would keep them down for a year if necessary." He announced a levy on union members to support such strikes, started taking strike votes, and in a half dozen instances presented his plan verbally to management, actually giving a strike deadline to at least one company. Newspaper reports naming specific "target" companies and a deadline of a few days after Christmas are discounted in industrial circles of the Ohio city.

Employers Organize—In mid-October the "Committee to Save Toledo's Payrolls" was formed. It is headed by Harris McIntosh, president of Toledo Scale Co., as chairman; with F. H. Adams, Surface Combustion Corp., and R. A. Stranahan, president of the Champion Spark Plug Co., as co-chairman. Lev Flournoy, Toledo public relations counsel, is its executive manager. The committee includes nine industrialists and 16 other civic leaders on a board of trustees. Within a short time over 2500 members had offered their services.

That this number could be increased by a campaign to obtain their help goes without saying, but the committee withheld such action, and resorted to an advertising campaign in Toledo newspapers, seeking to establish that the Gosser "plan," so-called, is fantastic and unworkable; that among the effects, if it should be adopted, would be irreparable damage to Toledo's many industries in a national competitive sense, and possibly bankruptcy for many of the smaller ones.

RICHARD T. GOSSER
. . . man with a plan

Start Long-Term Program — This campaign, has been accompanied by an appeal to all Toledo citizens, including labor unions, to unite in clarifying the city's community labor position. The committee declares Toledo has long suffered from dictatorial labor practices and that, as a result, industries don't want to locate their expansions there. And new industries have not come to the city. It is an objective of this community to clarify these practices and to relieve these conditions. That the committee thus will be embarked on a long-haul program, possibly without precedent in the nation, is freely admitted.

"Plan" Resisted — Meanwhile, the committee and most of the 125 industries involved are standing fast. Not opposed to pensions, properly arrived at on a company-by-company basis through accepted collective bargaining procedure, the committee and the industries are hard and fast against the proposed Gosser "plan," on the basis of what they know of it.

Ironically enough, while Mr. Gosser speaks often of his "plan," no completed plan ever has been formally presented to the industrialists involved or to the committee. What they know of it is based on: The UAW's verbal representation to some of the industries, Mr. Gosser's statements and advertisements, fragmentary comments from satellites, and a synopsis or outline of the plan that was submitted to the industries, leaving most of the pertinent questions unanswered.

Attacked by Press—The situation has been highlighted by the attitude of the *Toledo Blade,* long known as friendly to labor and one of the liberal papers of the Middle West. The newspaper, in a page-one editorial published Oct. 21 asked: "Are our industries going to knuckle under to Mr. Gosser's latest demands, knowing that if he gets away with these, he will be back for more?

"Are our workers, already fearful and apprehensive, going to let him increase unemployment in this community?

"Is everybody in Toledo, the butcher, the baker, the candlestick maker, going to let him disrupt the industrial life, the business life, upon which the prosperity of all of us depends?

"The *Blade* has no quarrel with organized labor. The *Blade* seeks to serve this whole community. . . . But the time has come to let Mr. Gosser know that he is neither going to rule or ruin Toledo."

With no formal and complete plan before them the committee has been at some difficulty in publicly attacking the Gosser proposals on the always shifting basis of what is known of them. It has had to ask questions. The committee takes the position that before its own answer to them could be complete it would have to have the final draft of a plan long enough to obtain the actuarial, financial and legal talent to review it.

Committee Wants To Know—In a recent advertisement, the committee asked some questions. From fragmentary statements, the committee said, there is only one thing outstanding, and that is the implied union statement, "Sign and then we'll tell you what you've signed."

"The companies affected know enough from what has been said to know that a 'plan' is in the making," the message continued. "It is on an area basis. It may be 10 cents or 12 cents an hour. Both figures have been used. A $125 per man payment is

demanded as a starter. Toledo's industrialists naturally wonder. They ask questions. They haven't got the answers and no one has volunteered them."

Twenty Questions—The committee then asked twenty questions, among them: Has an actuarial formula been followed? Is the plan the brainchild of local men or a reflection of national policy? Has the United Mine Workers plan which collapsed been considered? Why did the UAW depart from the company-by-company basis? What guarantee exists that there will not be an unlimited number of additional levies? Might not a fantastic cost figure result from giving due credit to past service of many workers?

What happens to the pensions of workers who are represented by no union at all? Will the plan protect members who someday might be declared to be not in good standing? Would not the continued stability of each employing firm tremendously influence the safety of the plan? Could administrators equal to the task be obtained? Does the plan meet the requirements of the internal revenue code?

What will the cost of administration be? Does the plan conform to the state insurance requirements? What guarantee is there that the amount asked is sufficient? Who would pay the benefits of those persons retired if a large number of employees or employers leave the city? What restrictions are proposed on the investment of the proposed funds? How would the plan affect other plans already in existence?

Only Few Vote—It is significant that strike votes taken concerning Gosser's demands in many of the 125 industries have been reflections of a splinter of a fraction. A majority of 2000 present from 6000 affected voted for the plan in one instance. In another, 29 men present, by their votes, chose to speak for 1500. While a handful of men in union voting frequently commits a much larger number, in the present instance the fraction voting has been small, and the issue, of course, is more important perhaps than any with which the union previously has been confronted.

Nationally, the Toledo situation is attracting a lot of attention. Nowhere else in the nation is it being duplicated or even imitated. The spectacle of one labor leader attempting to set up a pension province in the interior of the nation, operated differently from all other areas, and with the inherent competitive disadvantages such a situation implies, grips the minds of hundreds of editors and commentators and students of economics and the labor movement.

Timken Workers Return

Losers of $3.5 million in wages are Timken Roller Bearing Co. workers who are back at their jobs after a 38-day strike. The settlement, last among the larger steel companies, was made Dec. 12 on the general pension and insurance pattern established in the Bethlehem agreement.

Workers will receive minimum pensions of $100 a month, including social security, after 25 years of employment at age 65. Costs of an improved social insurance program will be borne jointly by company and employees.

Strength To Pay Pensions

Company-financed pension plans will tumble like houses of cards if the strength of industry is not safeguarded.

"Let us alone," Benjamin F. Fairless in effect warns government. The president of U. S. Steel Corp. spoke to the Illinois Manufacturers Association in Chicago, Dec. 13. The steel industry's security schemes "will fall if the strength of the foundation is overtaxed," he says. To meet its responsibilities, industry must be free from "burdensome taxation, interference with production, unwarranted probing, baiting, harassment and misrepresentation, along with recurrent attempts at fanning up an atmosphere of hostility to business."

Lone Star Financing Pipe Mill

LONE Star Steel Co. seeks to raise $7 million to finance construction of a cast iron pressure pipe plant and for other corporate purposes. Sale of first mortgage bonds will provide $5 million and sales of previously unissued common stock will provide $2 million.

The pipe plant, to be built at Lone Star, Tex., will be in production by August, 1950.

Lone Star also plans to build a $52.5 million steel plant in eastern Texas which the RFC will help finance.

CF&I To Improve Colorado Plant

COLORADO Fuel & Iron Corp. will improve its Pueblo, Colo., steel plant at a cost of between $2.5 million and $3 million. Engineering work is progressing, but will require several more months to complete. The projects may be operating by mid-1951.

New facilities will be:

A new rail slitting and rerolling mill, to be built in the space formerly occupied by the old rod mill. The products of this mill will include mine rails and fastenings, concrete reinforcing bars, fence posts, light structural shapes and miscellaneous items. Some of these products such as mine rails, reinforcing bars and fence posts are already being produced, but additional tonnage is needed.

Installation of seven preheaters at the main boiler plant which will make possible an additional output of 150,000 lbs of steam per hour. This installation will aid fuel economies and will permit further use of waste gases from the blast furnace.

Installation of a new 15,000 kw generator. This will supplement other generators and will provide power for rail slitting and rerolling mill.

Ryerson Finishes Chicago Unit

JOSEPH T. Ryerson & Son Inc. has finished construction of an addition to its Chicago steel distributing plant.

The new building provides about 118,000 sq ft of plant and office space. It is at 15th and Rockwell streets and forms a part of the north unit of Ryerson's Chicago facility. The total plant now has a capacity of from 75,000 to 100,000 tons of carbon, alloy and stainless steel which are carried in stock for shipment in almost every shape, size and finish.

Ryerson started in Chicago in 1842. The company has 13 steel-service plants across the nation.

Jessop Steel Seeks RFC Loan

RECONSTRUCTION Finance Corp. is considering a request from Jessop Steel Co., Washington, Pa., for a $1.3 million loan. Company employs 733; this would be raised to 1000 if the loan were granted. Frank B. Rackley, executive vice president, says Jessop's payroll of $250,000 monthly represents 12 per cent of the entire payroll of Washington. This area has been certified as critical from the standpoint of unemployment.

J&L Subsidiary Buys Barrel Units

AMERICAN Can Co. has sold two of its plants, at Toledo, O., and Atlanta, to the J & L Steel Barrel Co. The sale is effective Jan. 3.

The barrel company, a wholly owned subsidiary of Jones & Laughlin Steel Corp., will assume the galvanized ware and heavy steel container business of the can manufacturing firm. The Toledo and Atlanta plants are the only two of the more than 60 operated by American Can in the U. S. and Canada which specialize in heavy-gage and galvanized metals.

apital Outlays Fall

Plant, equipment expenditures in first quarter of 1950 estimated to be off 14 per cent

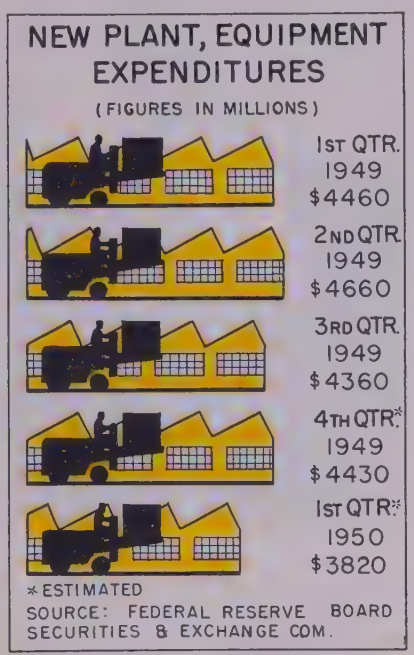
MERICAN business, exclusive of griculture, expects to spend about per cent less on new plants and quipment in the first quarter of 950 than in the corresponding period 1949. That is an estimate made y the Department of Commerce and ecurities & Exchange Commission. The sharp decline in expenditures nticipated for the first 1950 quarer is caused by seasonal influences nd also is a continuation of the rop which started last spring. Exenditures in the last half of this ear are expected to be 14 per cent elow the last half of 1948. Capital utlays for all of 1949, estimated at 17.9 billion, compare with a total of $19.2 billion in 1948.

Costs Cut Outlays—Actual expendtures for new plant and equipment in the third quarter of 1949 are estimated at $4.4 billion; expenditures for the fourth quarter will be about the same; the first 1950 period outlay will be about $3.8 billion. The reduced expenditures during 1949 are not fully accounted for by the decline in costs in the year. There was also a drop in physical volume. Although the 1949 outlay is less than in 1948, the year is still the second best in history.

As indicated in the table on this page, in only one industry group—electric and gas utilities—are capital outlays in the last half of 1949 estimated to be higher than in the last half of 1948. This industry also expects to spend more in the first quarter of 1950 than in the same period of 1949.

All other industry groups expect to spend less in the first 1950 quarter than in the same period of 1949. Declines range from 12 per cent for commercial and miscellaneous companies to about 40 per cent for railroads and other transportation companies. Manufacturing and mining companies believe they'll spend about 18 per cent less in the first quarter of 1950.

Outlays Under Estimates—Actual expenditures for the third quarter of 1949 are about 4 per cent under the previous preliminary estimate (see STEEL, Oct. 3, p. 44). Fourth quarter expenditures as now estimated are 4 per cent higher than previously expected. This reflects upward revisions in expenditures planned by manufacturing companies and electric and gas utilities.


NEW PLANT, EQUIPMENT EXPENDITURES
(FIGURES IN MILLIONS)
1ST QTR. 1949 $4460
2ND QTR. 1949 $4660
3RD QTR. 1949 $4360
4TH QTR.* 1949 $4430
1ST QTR.* 1950 $3820
*ESTIMATED
SOURCE: FEDERAL RESERVE BOARD SECURITIES & EXCHANGE COM.

Freight Cars Going Downhill

Domestic freight car deliveries in November were 4376, the American Railway Car Institute says. October production was 4532 cars.

Of November deliveries 2649 were from car builders; 1727 were built in railroad shops. Production on leading types of cars was: Box 1017, hopper 1394, gondola 1155, refrigerator 128, tank 124.

Orders in November totaled 1145. Of these 95 were placed with car builders, the remaining 1050 with railroad shops.

Backlog of orders as of Dec. 1, the institute reports, was: Car builders 5040, railroad shops 9106, for a total of 14,146. That compares with 17,377 on Nov. 1 and 106,405 on Dec. 1, 1948.

Truck Freight Tonnage Up

The volume of intercity freight hauled by Class I motor carriers in the third quarter of 1949 jumped 6.7 per cent over that carried in the same period last year.

This is the largest relative increase in traffic recorded in any quarter this year. It compares with increases of 2.9 per cent in the first quarter and 1.9 per cent in the second quarter of this year as compared to the same quarters last year. The 1368 Class I intercity common and contract carriers carried 33,511,763 tons in the third quarter, compared with 31,409,128 tons in the same period last year. Automobiles account for a large portion of the overall increase.

Orient Needs U. S. Steel

A large potential market in the Orient for structural shapes and other steel products made by West Coast mills is foreseen by C. M. Denton, president of Pacific Iron & Steel Exporting Co.

But this traffic might be lost, says Mr. Denton, if West Coast shippers are at a competitive disadvantage as a result of lower shipping charges to foreign-flag vessels or U. S. ships operating from the East Coast. He testified in San Francisco at a U. S. Maritime Commission hearing on a plea by two lines for subsidies in the Orient trade.

Lower shipping rates and more frequent sailings are the objectives of West Coast steel exporters. Shipping costs on structural shapes from the Pacific coast to the Orient are $29.30 a ton. From the Atlantic coast the rate is $28 a ton. There's an additional West Coast charge of $1.30 a ton for handling and wharfage.

Malleable Iron Needs Slip

Lack of orders for malleable iron products has forced the layoff of 140 employees at Ontario Malleable Iron Co., Oshawa, Ont. The 250 men still working go on a five-day week.

Chicago Buyers Optimistic

Four out of five participating in the Purchasing Agents Association of Chicago's survey are optimistic about first quarter business prospects. Only 21 per cent expect a decline from a year ago.

Buyers estimate that the 1949 business volume will be only 10 per cent lower than the 1948 level. Deliveries, prices, inventories, employment, production, backlog and business conditions show little variation for the last four months. More purchasing agents are buying on a 60 or 90-day basis than formerly. As of Nov. 30,

U. S. Business' New Plant, Equipment Expenditures

(Millions of dollars)

	1947	1948	1949*	1949 Jan.-Mar.	1949 Apr.-June	1949 July-Sept.	1949 Oct.-Dec.*	1950 Jan.*-March
Manufacturing	7460	8340	7130	1850	1880	1690	1710	1520
Mining	690	800	730	190	190	180	170	160
Railroad	910	1320	1340	360	380	310	290	220
Other transportation	800	700	510	130	140	130	110	80
Utilities	1900	2680	3160	680	780	790	900	740
Commercial and misc.	4430	5390	5040	1360	1290	1260	1250	1110
Total	16180	19230	17910	4460	4660	4360	4430	3820

* Estimated. Note: Figures are rounded and will not necessarily add to totals. Source: Commerce Department, SEC.

74 per cent were buying for this period, compared with 65 per cent Oct. 31 and 52 per cent Sept. 30.

Oil Field Goods Demand Off

Large increases in stocks of heavy oil on the West Coast have curtailed California oil field operations and reduced the demand for oil field equipment.

Offsetting this is an increased need for oil refining equipment. California refiners are expanding and modifying their facilities to process heavy petroleum into lighter products in greater demand.

Rain Aids Power Output

Heavy rains in the Pacific Northwest relieved drought conditions and enabled the Bonneville Power Administration to boost hydroelectric output.

The administration has restored 60,000 to 70,000 kw of interruptible power to Aluminum Co. of America at Vancouver, Wash., and to Kaiser Aluminum & Chemical Corp. at Spokane. The power was curtailed Oct. 26. Alcoa expects to increase output 25 per cent.

Ford Plant on Overtime

The Buffalo assembly plant of Ford Motor Co. will go on an overtime basis Jan. 3, operating nine hours a day, five days a week.

Consumer Prices Dip

Consumers' prices dipped 1.1 per cent from September to October, says the National Industrial Conference Board. Decreases were reported in 57 of the 61 cities included in the board's monthly survey. Over the year—October, 1948, to October, 1949—consumers' prices dropped 2.7 per cent.

The purchasing value of the consumer dollar (January, 1939, as 100 cents) was 62.5 cents in October. This is an 2.8 per cent increase from October, 1948.

All Business Off in October

Manufacturers' business slowed in October because of coal and steel strikes, says the Office of Business Economics, Commerce Department. Sales totaled $18 billion, a decline of $1.3 billion for the month. Value of new orders also fell below September levels. Inventory liquidation was continued but at a slower rate than in recent months.

The October decline in sales was heaviest in durables where sales for the month were $7 billion. They were $8 billion in September. The sales drop for this group was contraseasonal.

Shot-in-the-Arm Economics Hit

Both government and business must quit shot-in-the-arm economics. The government must stop its fiscal serums which bring economic jags.

CLAUDE ADAMS PUTNAM
. . . new NAM president

Business must realize that stimulants contributing to the immediate postwar boom are no longer available.

That's the diagnosis of Dr. Harold G. Moulton, president, Brookings Institution, who spoke before the National Association of Manufacturers' industry congress in New York, Dec. 7-9. (For other information on the NAM meeting, see STEEL, Dec. 12, p. 60). Dr. Moulton thinks certain factors aiding immediate postwar business are disappearing. He says: Capital expenditures for plant expansion have passed their peak; exports to Europe should decline; deficiencies in consumer goods supplies have been overcome; the level of armament expenditures may be reduced.

"Our future prosperity depends upon our capacity to create additional buying power," he says. "This requires an intensification of technological progress because increasing man-hour output constitutes the only foundation for higher standards of living. There is scant future in trying to sell more goods to the shrinking rich and middle classes."

The 1950 president of NAM is Claude Adams Putnam, president of Markem Machine Co., Keene, N. H. Markem makes power-driven devices for marking and identifying goods in process, finished articles and containers. A director of NAM fo six years, he served in 1949 as member of the association's executiv committee. He started his career a a machinist, joined Markem when i was organized in 1911 and has beer its president since 1929. As NAM president he succeeds Wallace F Bennett of Salt Lake City who be comes chairman of the NAM boar of directors.

Dutch Plan Steel Expansion

ROYAL Dutch Blast Furnace & Stee Co. is starting a $47,010,000 iron and steel expansion program. ECA will provide $23.5 million of the total and the rest will be provided through an issue of capital stock and by loans.

The company will increase its crude steel capacity from 340,000 to 570,000 tons per year by enlarging certain of its existing open-hearth furnaces and modernizing its existing plants. The company will also shut down its second-hand sheet mill and install integrated rolling facilities.

With completion of the expansion program, annual production of finished steel products will amount to 205,000 tons of plate, 60,000 tons of hot-rolled sheet and 150,000 tons of cold-rolled sheet and tin plate. Holland will continue to be one of the largest European importers of finished steel, even though the increased production will be for domestic consumption.

Royal Dutch is 25 per cent owned by the Netherlands government, 15 per cent by the city of Amsterdam and 60 per cent by private shareholders.

Antipollution Board Reports

OHIO River Valley Water Sanitation Commission, now 17 months old, has taken nine steps toward antipollution maturity. The eight-state organization just issued its annual report.

Among its accomplishments are:

Establishment of standards for the 22-mile stretch of the Ohio known as the Cincinnati pool. Cincinnati and other cities discharging into the pool are designing new sewage treatment works.

Survey of Pittsburgh and Huntington, W. Va., water areas to expedite construction of remedial works on these badly polluted sections of the river.

Action to prevent discharge of new pollution from industrial plants in the form of hardness-producing wastes.

Survey of the pollution loads in the Wabash river.

Co-operative program with Armco Steel Corp. and Ohio to curb water pollution from phenol (See STEEL, Dec. 5, p. 66).

les May Double

Lombard Corp. finds new ideas pay off in designing forming, extruding equipment

LSED on inquiries and quotations outstanding, 1950 sales of the Lombard Corp., Youngstown, should exed $2.5 million, G. J. Meyer, president, anticipates. This compares th sales of $1,350,000 in 1949 and million in 1948.

The corporation was formed five ars ago by D. L. Lombard, chairan. Its growth has been phenomial.

Mr. Lombard formerly worked as engineer for the Truscon Steel o., Republic Steel Corp. subsidiary, nd served the War Production Board s industrial specialist. He then beame associated with the Schloemann ngineering Corp. as assistant to the resident and developed an intimate nowledge of the design and manuacture of large presses for extrusion f aluminum, copper, bronze and nagnesium.

When Schloemann was taken over y the alien property custodian, Mr. Lombard returned to Youngstown to form the Lombard Corp. to engage in engineering and consulting work and the design of mechanical and hydraulic equipment with particular emphasis on extruding and forming.

Improve Schloemann Designs—Lombard Corp. designs embody the basic ideas of Schloemann plus such improvements as the self-contained oil hydraulic system for extrusion presses mounted on a platform above the press, thus saving floor space and simplifying the operation.

Lombard has an arrangement with the United Engineering & Foundry Co. for the manufacture and assembly of its equipment, work now under way including five large presses.

Baling Plants for Pakistan—The company also is in the process of furnishing and installing five jute baling plants in Pakistan, costing over $1 million. Plants of this type formerly were furnished by Great Britain. Customers in this country currently include large steel and metal companies and manufacturers of extruded metal products.

Mr. Meyer, president, was vice president of the Truscon Steel Co., before it was acquired by Republic Steel. After Republic acquired control, Mr. Meyer was retained as general manager of sales and a director.

Plan New Plant—Lombard plans construction of a combined engineering and sales office with an experimental plant or laboratory. Company engineers already have developed techniques for the extrusion of stainless steel and other ferrous alloys.

Section of Gas Pipeline Finished

CONSTRUCTION has been completed on the first section of the "super inch" natural gas pipeline from Texas and New Mexico fields to northern California.

This section starts about 50 miles south of San Francisco and runs to a point near Hollister, about 130 miles south of San Francisco. Here it has been connected with another line from southern California. Until the full line from Texas is completed, this section will be used to bring gas from the California fields to northern California distribution lines.

Construction will soon start on the other end of the "super inch" in the Arizona desert.

Weirton Steel Co. Installs 2-Mile Belt To Haul Coal from Morgantown Mine

"SUPER RUBBER railroad" is what you might call the 10,900-ft conveyor belt that Goodyear Tire & Rubber Co. installed in Weirton Steel Co.'s 2-mile tunnel near Morgantown, W. Va.

The single unit conveyor will haul coal from the washery located near the Weirton coal mine through a tunnel in an adjacent hill to a tipple on the Monongahela river. A 300 hp motor drives the belt which is required to deliver about 250 tons of coal per hour to railroad or barge loading chutes. The belt travels 300 feet per minute.

Goodyear furnished more than 22,000 ft of belting for the haul and return through the tunnel. The "rubber" railroad consumed 152,798 lb of rubber, 50,941 lb of cotton, 39,754 lb of steel cable; the whole thing weighs about 122 tons. A lump of coal dumped on the belt will drop into a waiting barge 36 minutes later. After barges are loaded, they proceed down the Monongahela to the Ohio river at Pittsburgh. From there they go to Weirton, W. Va. The conveyor is expected to be in operation this month. Operations in the $5 million coal pit are expected to start next spring.

BIG BELT: In Fig. 1 is artist's conception of Weirton Steel Co.'s single unit conveyor belt just installed at the Weirton mine near Morgantown, W. Va., by Goodyear Tire & Rubber Co.'s Mechanical Goods Division. Conveyor carries coal through 2-mile tunnel from transfer house to loading point on Monongahela river. In Fig. 2 can be seen transfer house and tail end of conveyor belt. Coal from washery arrives at transfer point on short belt and dumps coal on main belt for journey through tunnel. Fig. 3 shows 30-in. belt taking coal through tunnel. Fig. 4—Coal comes off river tipple

Windows of Washington

By E. C. KREUTZBERG — Washington Editor, STEEL

There'll be no retreat in the campaign to break up big business. Suits against A & P, the Big Four meatpackers, A T & T will be prosecuted. New suits are in the offing

THE ADMINISTRATION's new "positive program" to unify antitrust procedure does not mean, as has been reported, any softening in enforcement policy.

There is to be no retreat in the campaign to break up big corporations. Current actions to break up the Big Four meat packers into 14 separate integrated concerns, the A & P grocery store chain into seven regional chains stripped of manufacturing subsidiaries and to remove Western Electric Co. from the American Telephone and Telegraph Co. empire will be prosecuted vigorously. And new suits to break up other big combinations are in the offing.

A New Program — Adopted by President Truman at the recommendation of Commerce Secretary Charles Sawyer, the program aims:

1. At co-ordinating the enforcement activities of the Justice Department and the Federal Trade Commission.

2. At promoting compliance by educating business men as to what they can and cannot do under the antitrust laws.

The latter angle is based on Mr. Sawyer's belief that most business men want to obey the law and will do so if they have a clear understanding of it.

The new program will be shaped up by an interagency committee headed by Secretary Sawyer. Justice, FTC and the Council of Economic Advisers will be represented. Other agencies may be called in after the work gets rolling. At the start the committee is to be concerned only with co-ordination of policies dealing with "unfair competition, monopoly and other restraints of trade." It will not be concerned with the many other problems of business—as those presented by the present badly constructed tax system.

That there is no intention to recede from the policy of seeking the breakup of more large aggregations is indicated by utterances like President's Truman's blast against the "big interests" in his Kansas City speech. It also is indicated by what is going on in the House Judiciary Monopoly subcommittee. Its hearings have been conducted by Chairman Emanuel Celler (Dem., N. Y.) as an administration sounding board. Mr. Celler has expressed this "bird's-eye view of what is formulating in my mind:"

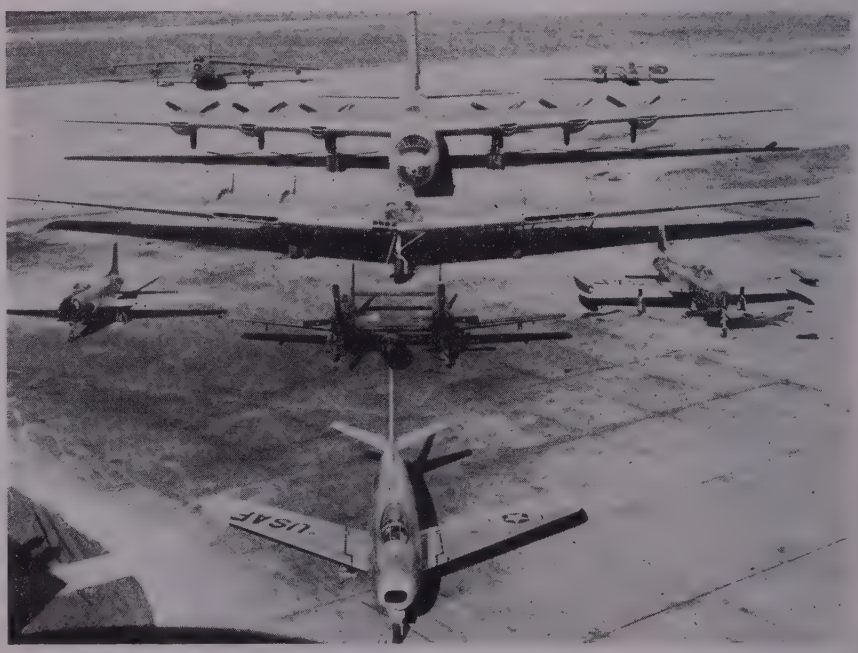
Give some agency, perhaps the FTC a broad definition of authority expressed in general terms like the Sherman Act. The agency would pass on contemplated mergers or acquisitions and issue desist orders subject to court review. The agency also would be instructed to study existing large organizations and order them broken up, subject to court approval, if such action "would promote competition, result in increased efficiency, and otherwise be in the public interest."

Time and Again—Mr. Celler names large interests he thinks ought to be broken up. He has mentioned United States Steel Corp., General Motors Corp., General Electric Co., Westinghouse Electric Co., the big distillers, the Metropolitan Life Insurance Co. and some big soap makers.

He classes as a "myth" the popular impression that big corporations are efficient. He brought out an opinion that U. S. Steel common is worth $100 a share and is selling for abou $25 because of bad management. Ir creased efficiency he says, has re sulted from breaking up big interest in the past: "Despite dire predic tions in the '30s, the effect of di vestitures of operating companie from public utility holding companie has reduced rates for gas and elec tricity and an increase in the valu of stock of the operating companies."

Something Baneful in Bigness?— "Something must be done with reference to size in and of itself," he declares. "How far should government allow such concentration as that of General Motors—in washing machines, Frigidaires, diesel engines, trucks, Delco products? It has 400,000 stockholders, 400,000 employees, operates all over the country and in various parts of the world. You get to a point where it is so large that it effects the lives and happiness of so many people that you could not let it fail. No matter how inefficient it might become, you just could not let General Motors fail, no more than you could let Metropolitan Life Insurance Co. go to the wall, no more than you could let General Electric go to the wall. Is there not something baneful in such a situation?"

Again reflecting the administration



AIR FORCE: Lined up on the parking ramp at Andrews Air Force Base, Md., are (front to rear): North American F-86 (world's speed holder—670.981 mph), Lockheed F-80 "Shooting Star," North American F-82 (night fighter), Republic F-84 "Thunderjet," Northrup B-49 "Flying Wing," Consolidated Vultee B-36 (world's largest land-based bomber), Boeing B-47, and North American B-45

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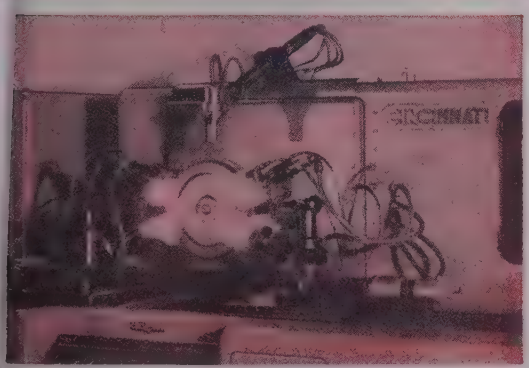

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THE CINCINNATI MILLING MACHINE CO

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viewpoint, Rep. Celler sees no need for breaking up big unions along with big corporations:

"When you have the U. S. Steel Corp. employing people in the thousands, it is essential for labor unions to grow larger. Combinations of labor that attempt to raise wages and purchasing power and seek some measure of security for a majority of the workers should not be put in the same category as aggregations of capital put together by stock jobbing that have the power to raise and lower prices at will, to create artificial scarcities and develop price maintenance. We would not have huge labor unions if we had small industrial entities. So, first get after capital; then, if labor does not follow as it should, get after labor."

Employment Review Board Set Up

INDUSTRIAL EMPLOYMENT Review Board has been set up by Secretary Johnson as an integral feature of the Defense Department's industrial security organization.

Its function is to receive and pass on appeals from military contractors whose employees have been denied access to classified information. Chairman of the new board is John T. Mason, production consultant attached to the Munitions Board. The new board has authority to establish area or regional boards in case of future need.

The Taxpayer Doesn't Lose!

BUSINESS LOAN losses of the Reconstruction Finance Corp. average about 0.75 per cent, RFC Director Harvey J. Gunderson told the Douglas subcommittee, Joint Committee on the Economic Report, during its investigation of government monetary and fiscal policies.

But the losses, he says, do not come out of taxpayers; they are more than balanced by net profits from charging an average interest of 3.5 per cent on loans. Since RFC started its lending operations in 1932 its net profits on this kind of business, he reports, have come to a little more than $375 million.

Art of Ship Repair To Stay Alive

TO KEEP ALIVE the art of ship repair and maintenance, the Navy has activated—in the Naval Reserve—ten ship repair divisions and will increase this to 20 divisions in the current fiscal year.

Each division consists of 200 enlisted men and ten officers; it will engage in actual ship repair work at nearby naval ship yards, over convenient periods, thus serving as the nucleus around which ship repair personnel will be built in the event of another war.

Already organized are ship repair divisions in Boston, Philadelphia, Charleston, S. C., San Diego, Calif., Bremerton, Wash., Brooklyn, N. Y., Portsmouth, Va., New Orleans, Vallejo, Calif., and Washington, D. C. Ten additional divisions will be at Providence, R. I., Camden, N. J., Chicago, St. Louis, Portland, Oreg., Newark, N. J., Jacksonville, Fla., Cleveland, Compton, Calif., and one other point—possibly San Francisco—still to be selected.

Steelman Gets Budget Figures

FEDERAL GOVERNMENT expenditures for research and development work will come to $1380 million, according to a tabulation made by the Budget Bureau for Presidential Assistant John R. Steelman.

The figure includes an unspecified amount for construction of buildings for research and development work, particularly for the Atomic Energy Commission. The breakdown of expenditures by departments is:

Atomic Energy Commission $320 million; Federal Security Agency $42 million; General Services Administration $31 million; National Advisory Committee for Aeronautics $70 million; Tennessee Valley Authority $24 million; Agriculture $55 million; Commerce $19 million; Defense $750 million; Interior $46 million; all other $23 million.

RFC Loans to Business

OCTOBER business loans by the Reconstruction Finance Corp. included these advances to firms identified with the metalworking industry: Kaiser-Frazer Corp., Willow Run, Mich., $34.4 million, for ten years, for machinery, equipment and working capital for automobile production.

Kaiser-Frazer Sales Corp., Willow Run, Mich., automobile distributor, $10 million, for 18 months, for working capital.

Clinton Machine Co. Inc., Clinton, Mich., manufacturer of ¾ to 3 hp gas engines, $600,000, for five years for construction, working capital and debt payment.

Autocar Co., Ardmore, Pa., motor truck manufacturer, $3 million for ten years, for machinery, equipment, construction, tax payment and working capital.

Hytron Radio & Electronics Corp., Salem, Mass., manufacturer of radio tubes and television sets, $800,000 fo five years, for construction, equip ment machinery and working capita

The account with Kaiser interest among RFC's most important bo rowers, is in fine shape, say RF spokesmen. Kaiser Steel Co.'s origi nal indebtedness of $123.4 million ha been cut to $95.8 million in accord ance with the schedule. Loans of $2 million to Permanente Metals Co and $1 million to Kaiser Cargoes Inc have been paid in full.

New Type Ship Passes Test

A NEW TYPE of ship, designed by the Army Transportation Corps afte five years' research, has come through successful dock trial tests at Charles ton, S. C.

It has two Voith-Schneider cy cloidal propellers that eliminate need for rudders, shaft tube, skeg and conventional steering mechanism as used in screw propulsion. And it has great maneuverability. The prototype craft is the 127-foot Olson, intended for use in laying mines in shallow harbors.

Though it can carry the same load as the conventional deep-sea model, it costs half the price. Army authorities say the tests indicate that cycloid propellers will be of equal value for self-propelled lighters, towboats, ferries, floating cranes and tugboats.

The Voith-Schneider propeller is a rotating disc set in the hull bottom, flush with the bottom. About the periphery of the disc, four to eight vertical blades are set perpendicular to the disc. The blades perform an oscillating or sculling motion as the disc is rotated—like an egg-beater. The two propellers on the Olson are driven by a single shaft from the engine through a right-angle gear box placed between the propellers on the vessel centerline.

New Name for Federal Supply

FEDERAL SUPPLY Service is the new name of the former Bureau of Federal Supply.

Along with the new title it received from General Services Administrator Larson a redefinition of functions that concern all government procurement of supplies except those of the miltary departments. Questions about character of goods to be purchased, bid opening dates, federal specifications, and related information should be addressed to Federal Supply Inquiry Office, Attention F. G. Moyer, Seventh and D streets S. W., Washington. Mr. Moyer's telephone number is DIstrict 5700, Extension 697.

Members of Iron & Steel Institute gather at Bethlehem Steel Co. as . . .

Charles M. Schwab Memorial Library Is Dedicated

AFTER attending the dedication ceremony of Charles M. Schwab Memorial Library last week (STEEL, Dec. 12, p. 61) members of the American Iron & Steel Institute gathered in the lobby of Bethlehem Steel Co.'s general offices for a picture.

In front row, center, is Eugene G. Grace, chairman, Bethlehem Steel Co. To his right is Benjamin F. Fairless, president, United States Steel Corp. To the left of Mr. Grace is Walter S. Tower, president, American Iron & Steel Institute.

In the first row, in the usual order, are Frank Purnell, president, Youngstown Sheet & Tube Co.; Ben Moreell, chairman and president, Jones & Laughlin Steel Corp.; Edward L. Ryerson, chairman, Inland Steel Co.; Charles R. Hook, chairman, Armco Steel Corp.; H. G. Hilton, president, Steel Co. of Canada Ltd; Carl I. Collins, president, Superior Steel Corp.; L. F. Rains, president, A. M. Byers Co.; and E. T. Weir, chairman, National Steel Corp.

Second row: Charles M. White, president, Republic Steel Corp.; Elton Hoyt II, Pickands, Mather & Co.; Henry A. Roemer, chairman and president, Sharon Steel Corp.; H. G. Batcheller, chairman, Allegheny Ludlum Steel Corp.; Hoyt A. Moore, Cravath, Swaine & Moore; Nathan L. Miller, general counsel, U. S. Steel; Irving S. Olds, chairman of the board of directors, U. S. Steel; E. L. Parker, president, Columbia Steel & Shafting Co.; Harold L. Hughes, vice president, U. S. Steel; J. Heber Parker, chairman, Carpenter Steel Co.; Alexander E. Walker, chairman and president, National Supply Co.; W. W. Holloway, chairman, Wheeling Steel Corp.

Third row: Harry C. Crawford, vice president, Bethlehem Steel; John M. Gross, vice president (retired), Bethlehem Steel; Carl W. Meyers, president, Colorado Fuel & Iron Corp.; Joseph H. Carter, president, Pittsburgh Steel Co.; W. P. Snyder Jr., chairman, Crucible Steel Co. of America; John T. Whiting, chairman and president, Alan Wood Steel Co.; Robert W. Wolcott, chairman, Lukens Steel Co.; James H. Ward, vice president, Bethlehem Steel; George S. Rose, secretary, the institute; and Quincy Bent, vice president (retired), Bethlehem Steel.

Fourth row: Paul S. Killian, Arthur F. Peterson, Daniel D. Strohmeier and Stewart J. Cort, are Bethlehem Steel vice presidents. Arthur B. Homer is president of Bethlehem Steel. Paul Mackall, Frederick A. Shick, Robert E. McMath, Joseph M. Larkin and Norborne Berkeley are Bethlehem Steel vice presidents.

Suggestions Pay Off at Dinner

THE PRESIDENT of the National Association of Suggestion Systems spoke at the annual Suggestion Award Winners dinner meeting of Lukens Steel, Coatesville, Pa., last week.

Francis W. McMenimen, supervisor of the suggestion plan of Public Service Electric & Gas Co., Newark, N. J., and newly elected president of the suggestion system association, was the speaker. It was the second successive time that the president of the organization spoke at such a Lukens dinner meeting; it was the fifth annual dinner for suggestion award winners at Lukens.

CALENDAR OF MEETINGS

Dec. 21-22, National Electrical Manufacturers Association: Fourth annual national farm electrification conference, Stevens Hotel, Chicago. Association headquarters are at 155 E. 44th St., New York.

Dec. 26-31, American Association for the Advancement of Science: Meeting, New York. Association headquarters are at 1515 Massachusetts Ave., Washington.

Jan. 9-13, Society of Automotive Engineers: Annual meeting and engineering display, Hotel Book-Cadillac, Detroit. Society headquarters are at 29 W. 39th St., New York.

Jan. 10-11, American Home Laundry Manufacturers' Association: Fourth national home laundry conference, in Chicago.

Jan. 10-12, Conference on Industrial and Safety Problems of Nuclear Technology: Sponsored by New York University and Atomic Energy Commission, at New York University, Washington Sq., New York.

Jan. 10-12, Society of the Plastics Industry: Reinforced plastics division meeting and fifth annual technical session, Hotel Cleveland, Cleveland. Society headquarters are at 295 Madison Ave., New York.

Jan. 12-13, Southern Supply & Machinery Distributors' Association: Industrial distribution forum and midyear meeting, Edgewater Gulf Hotel, Biloxi, Miss.

Jan. 16-18, Truck-Trailer Manufacturers Association: Meeting, Edgewater Gulf Hotel, Edgewater Park, Miss. Association headquarters are at 809 National Press Bldg., Washington.

Jan. 16-19, Plant Maintenance Show: Sponsored by American Society of Mechanical Engineers and Society for the Advancement of Management, at the Public Auditorium, Cleveland. Mechanical Engineers' headquarters are at 29 W. 39th St., New York.

Jan. 18-20, American Management Association: Conference on management problems, in San Francisco. Association headquarters are at 330 W. 42nd St., New York.

Jan. 18-20, American Society of Civil Engineers: Annual meeting, Hotel Commodore, New York. Society headquarters are at 33 W. 39th St., New York

Jan. 19, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo. This meeting originally was scheduled for last Sept. 29, but had to be postponed because of the impending steel strike.

Jan. 22-24, Institute of Scrap Iron & Steel Inc.: Annual convention, Hotel Statler, Washington. Institute headquarters are in the Dupont Circle Bldg., Washington.

Jan. 23-24, Industrial Furnace Manufacturers Association: Meeting, Dearborn Inn, Dearborn, Mich. Association headquarters are at 420 Lexington Ave., New York.

Jan. 23-27, American Society of Heating & Ventilating Engineers: Southwest air conditioning exposition, State Fair Park, Dallas. Society headquarters are at 480 Lexington Ave., New York.

Jan. 30-Feb. 1, American Material Handling Society, Chicago Chapter: Midwest material handling conference, in conjunction with Illinois Institute of Technology, in Chicago.

Feb. 9-10, American Foundrymen's Society, Wisconsin Chapter: 13th annual foundry conference, in Milwaukee. Chapter headquarters are at 610 W. Michigan St., Milwaukee.

Feb. 12-16, American Institute of Mining & Metallurgical Engineers: General meeting, Hotel Statler, New York. Institute headquarters are at 29 W. 39th St., New York.

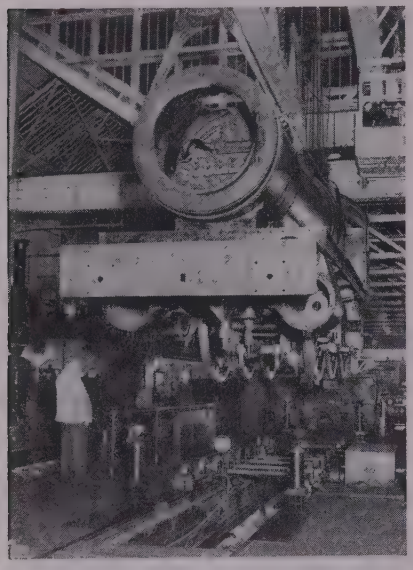
Feb. 13-14, Society of the Plastics Industry (Canada): Canadian annual meeting, Royal York Hotel, Toronto, Ont. The Canadian segment of the society is associated with the American society whose headquarters are at 295 Madison Ave., New York.

BRITAIN . . . Braces Herself for the Next General Elect

Voters will decide, probably in February or March, whether or not they like the Labor government's diagnosis and prescriptions for the nation's economic ills

BRITISH businessmen are wondering if they are in the same position as the man who had his appendix removed, only to discover that his liver was the source of the trouble all along.

The cry is growing louder in Britain that the multiple appendectomies made on the economy since the war—devaluation, nationalization, wage and price controls—have done



RAIL EQUIPMENT MAKERS BOOM
. . . export outlook still good

little more than temporarily conceal the basic liver condition—statism. Judgment of the labor government's diagnosis will come in the next general elections, probably in February or March. But if Labor's decisions are repudiated, what then? The Conservatives would still have to deal with the basic problems.

Short-Term Good — Devaluation of the pound has been beneficial at least for the short term. A modest business downtrend in mid-1949 has been stopped. For at least the next six months industrial production should be near capacity. The government's promise to cut the capital expenditure program by $700 million will help the public budget, but none of these measures will ease industry's heaviest load — taxation. Although taxes will not rise this year, Sir Stafford Cripps bluntly states they won't be lowered either.

Metalworking manufacturers plan a frontal and flanking campaign to bag the American dollar in 1950. Under no delusions about the strength of United States competition, industrialists believe markets for 1949 will still be good in America for British-made cars, machine tools, textile machinery and some specialty metal products. Exports to the U. S., which lagged last year from April through October, rose to $20.5 million in November, close to the first quarter monthly average of $21.2 million but still under the $22.2 million monthly average for 1948.

Even more important than this frontal attack will be a flanking movement in Canada. By buying more steel, autos and capital equipment from the British, the Canadians may be able to balance their trade ledger with Americans. The British would get the Canadian dollar, valued almost as much as the American, and some U. S. exchange. In 1949 Canada was the world's largest market for British automobiles. Sales of British coal and iron and steel products to the dominion also soared last year.

Devaluation Helps Autos—Of all metalworking industries, devaluation is helping automobiles the most. Sales are booming in Switzerland, Belgium, Luxemburg, Iran and South America, as well as in Canada. Output of British vehicles in 1949 probably totaled about 390,000 autos, 210,000 trucks and 100,000 farm tractors.

Even though producing more than before the war, automakers are still working at only about 75 per cent of capacity. This is primarily because of a shortage in sheet steel that never has been overcome since the end of the war. Automen have been forced to resort to conversion. From Belgium, Luxemburg and France they buy semifinished and have it rerolled in the United Kingdom. This is costly and may mean a price increase this year, possibly on tractors.

Machinery Sales Up — Sales of capital machinery used in metalworking operations increased last year over the 1948 level which had been the previous alltime high. Devaluation accounts for this. Last summer operations sagged alarmingly for manufacturers of machine tools, materials handling equipment and special production machinery.

Textile Machinery Market Brisk—The British are the largest manufacturers of textile machinery in the world. In 1937 the industry's total production was worth about $52 million, $144 million in 1947, $204 million in 1948 and about $235 million in 1949. In 1937 total exports were worth $32 million, $116 million in 1948 and $140 million in 1949. More than 20 per cent of these exports go to the U. S.

Shipbuilding Down — Compared with a year ago, British shipbuilders are in bad shape. About 2000 are unemployed in the industry. Order backlogs indicate a further decline this year. Reconversion work and repair jobs on war damaged vessels are finished. Shipbuilders must make shift with routine repair contracts and the relatively few new ship jobs coming in.

Putting the damper on shipbuilding are increased costs. A Pacific & Orient liner, Himalaya, just finished, cost 55 per cent more when completed than was originally estimated in January, 1946, when first ordered.

Rail Equipment Prospects Good—British makers of railroad equipment have been going full tilt during 1949; prospects are nearly as good for 1950. They have been hampered only by steel shortages, but this is clearing up.

Bulk of their business is export, especially for British colonies. Severe limits have been placed on reconstruction and modernization of British domestic equipment. When the overseas buyers tighten, home railroads will get their innings. Steel rails are already more plentiful for U. K. purchasers.

In 1948 the government-owned railroads operated at a $19 million loss. The deficit was about $56 million in 1949. British freight rates are about 55 per cent higher than they were before the war. If requests for another boost now being considered by the Transport Commission are approved, rates would be 81 per cent above prewar levels. U. S. freight rates are 61 per cent above the 1935-1939 average.

Iron Founders Hit — Foundrymen last year had no serious raw material troubles for the first time since the war. But they did have sales problems. Castings demand sagged slightly in every industry

Output Economy Seen for . . . WEST GERMANY

The new nation has a potentially strong domestic market of 50 million people who may support a mass production economy similar to America's

ast year except automotive and farm quipment. Producers of these classes products can keep foundrymen oing at good rates in 1950, but the eam has been skimmed.

Steel Output Up—Steel production the pride of industrial Britain. It hit n estimated 17,360,000 net tons in 949, and it should be higher still in 950. The 1948 tonnage was 16,662,-40; it was 14,250,880 in 1947. The British Iron & Steel Federation laims that U. K. steel, f.o.b. Britain s the cheapest in the world.

Structurals, plates and sheets still re underproduced and will continue o be in 1950. Supply-demand ratio n other products is about even.

Steel Expansion Progresses—The ron and steel investment program, egun in 1946, is making progress. It involves installation of 2.8 mil-ion tons more of blast furnace ca-pacity, complete with auxiliary coke ovens. Rolling mill capacity is being expanded, particularly for produc-tion of hot-rolled strip, cold-rolled sheets and tin plate. Capacity to produce billets, structural steel and wire rod is also expanded. Con-struction of the new works for Steel Co. of Wales is advancing rapidly. If completed as now planned, the program will cost about $1 billion. Nearly $70 million worth of equip-ment has or will come from the U. S.

There's no agreement on either the cure or the diagnosis of Britain's economic maladies. Some Britons say the nation's troubles stem as much from this sharp cleavage in opinion as from war weariness and statism. A question many are ask-ing is: Will the next general election bring an operation similar to those performed in New Zealand and Australia?

ON these pages are two more articles in a series on the economic pasts, presents and futures of the major Western European countries. On Dec. 5, we wrote about Italy and Sweden, on Dec. 12 about France and Belgium-Luxem-burg. Next week we conclude the series with a summary of the situation in Britain and on the continent. Complete iron and steel statistics for all indus-trial nations of the world will be carried in the 1950 Metal-working Yearbook issue, Jan. 2.

WESTERN GERMANY is writing her new economic history on pages where the previous story was only partially erased. Although some of the fresh passages remain illegible or obscure, a new trend can be seen. Western Germany has the chance to establish a mass production economy following the American model.

Despite heavy industrialization in Europe, mass production on the American scale has never been prac-tical. National boundaries interfere and chop big markets into little ones. Compartmentized industries can ex-pand only so much. Before the war, wide variance in incomes limited markets for standard products. Only Germany had the population and the technology to produce like Ameri-cans. But from the middle of the 19th century until 1945, militarism prevented an economic development such as occurred in the United States.

New Route?—Western Germany may be back on the track. In that country live 50 million people, most of whom haven't bought a new car or major appliance in at least ten years. In that area is a population impover-ished, but with an equalized income and ripe for cheap, standard products. In that area lies the bulk of old Ger-many's industrial plant.

West German government, business and labor leaders think the time has come to shift emphasis from special-ized export trade to an economy con-centrating on mass production goods.

That is conditioned by one big "if": Money. Money to equip plants to mass produce consumer goods on an American basis. Money to rebuild service industries.

Allied authorities are being urged to ease investment restrictions. Out-right loans, credit and partnerships will and are being sought from for-eigners. The coal industry needs to modernize to the tune of $930 million. The steel industry wants to spend $476 million.

To attract foreign capital, this may be the campaign of persuasion:

Circumspect behavior to show the world Western Germany's peacetime path.

No nationalization of industry.

Speedy reorganization of the steel industry, as required by Law No. 75.

Assurances that the Ruhr has the know-how to mass produce.

Nationalization—Labor wants na-tionalization of steel and coal, but a compromise is possible.

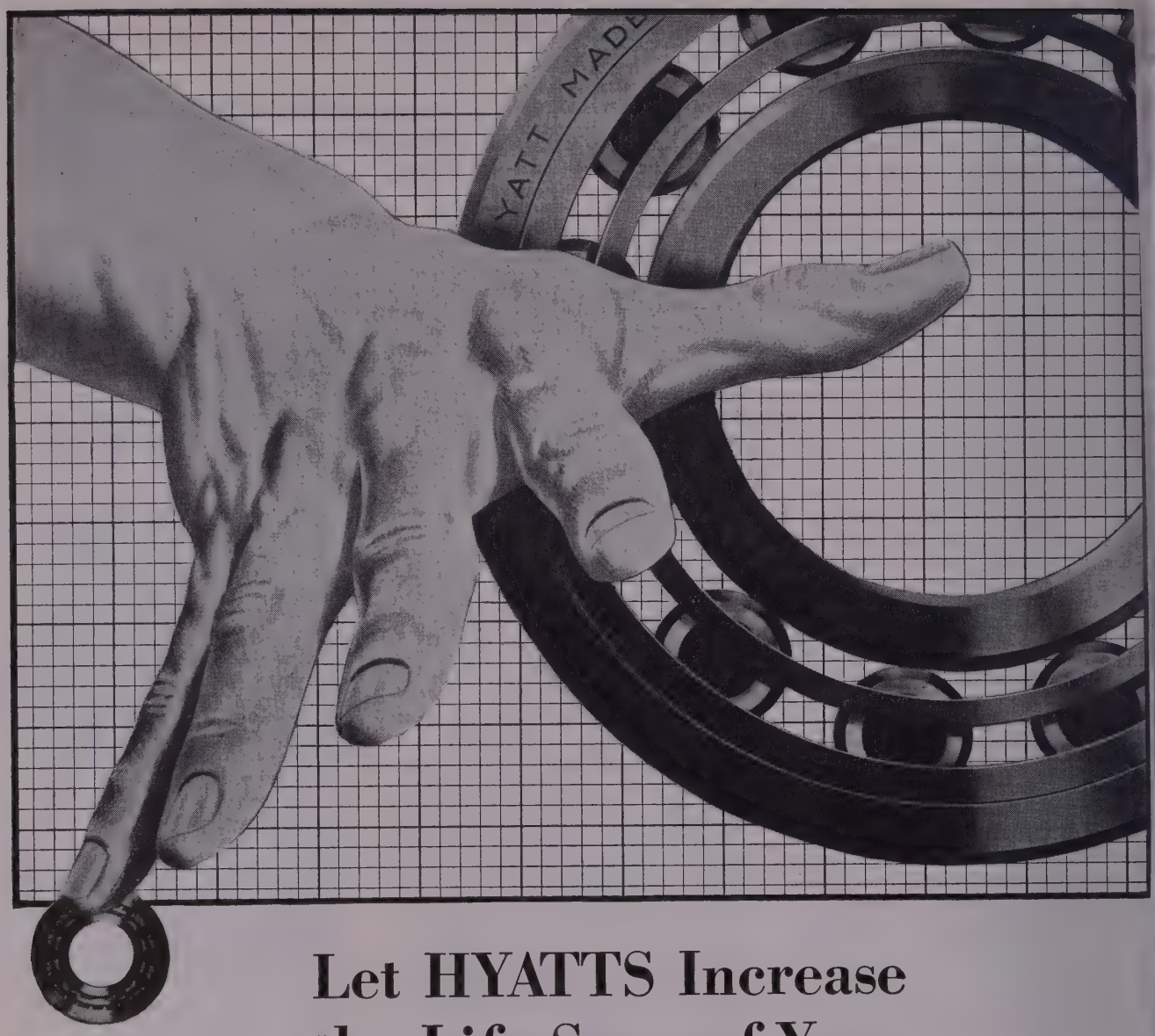
Reorganization of Steel—The 12 German custodians of steel are still wrestling to organize the industry on a vertical, integrated basis. Separate, competitive companies will be formed. The job is tremendous, but the first draft of plans will be ready soon.

Technological Know-How — Dis-mantling is about over. In spite of this factor and war damage, general industrial output is now about 93 per cent of the 1936 level. Steel produc-tion is 60 per cent, nonferrous metals 83 per cent, machinery 95 per cent, chemicals 107 per cent and consumer goods 91 per cent. Most of this out-put has been for export.

Machinery and auto industries are in the best shape. Machinery exports are holding well. About 170,000 cars and trucks were built in 1949, 50 per cent more than the total production in 1945-1948. About 250,000 vehicles, the 1936 output, may be built in 1950.

Western Germany is bubbling with a new optimism. If it can get invest-ment funds, 1950 may be a purple passage in its economic history.

NEW HOUSING FOR GERMANY
. . . Messerschmitt shifts to prefabs



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HYATT ROLLER BEARINGS

A. H. ALLEN Detroit Editor, STEEL

Mirrors of Motordom

Studebaker delays introduction of new automatic transmission until second quarter as production timetable is upset. Claimed to represent important forward step

DETROIT

STUDEBAKER CORP., going like a house afire with its radically styled 1950 models, of which well over 90,000 have now been built, had planned considerable fanfare to accompany introduction of its new automatic transmission shortly after the first of the year. Detailed descriptions, drawings, photographs and charts were being packaged for transmittal to all newspapers and magazines, when a hitch developed. As with so many new devices, the production timetable was upset by delays in gearing up processing equipment, so now the unit will not be available until some time in the second quarter of 1950. So the publicity push was called off for fear that too much of a clamor would develop among buyers anxious to acquire cars equipped with the novel transmission. A few publications did receive details and have been publishing them, with disconcerting effect on their competitors.

Joint Development—The transmission is a joint engineering development of Studebaker and Borg-Warner Corp. and differs from anything yet placed on the automotive market, providing a number of distinct advantages in operation and economy: Positive mechanical drive in high gear, eliminating slippage through the torque converter, elimination of creep through solenoid-actuated braking of rear wheels while car is at a standstill, easy "rocking" of car to get out of mud or snow, no backward roll when stopping on upgrade, air cooling, elimination of clutch pedal and doubled width of brake pedal, engine braking on down grades, "push" starting at relatively slow speeds, mechanical lock through pawl and gear in "parking" position, weight only 31 pounds more than the 189-pound conventional transmission plus overdrive, and length 3¼ inches less than the overdrive transmission and bell housing.

Torque Converter — Basic design comprises a three-element torque converter—impeller, turbine and stator, two epicyclic gear sets—ring gear, sun gear and three planet gears, two gear-type oil pumps, a multiple-disk clutch with four friction plates, a single-plate clutch controlling the direct-drive feature, three band-type clutches with servo mechanism, three free-wheel units, a valve block assembly and a centrifugal mechanical governor.

Selector lever on the steering column has five positions—from left to right, "P" (parking), "N" (neutral), "D" (direct), "L" (low), and "R" (reverse). The engine cannot be started unless the lever is in P or N position. D position is used for normal forward driving and comprises two automatic speed ranges, while L position is intended for engine braking on down grades and high starting accelerations. To rock the car the lever is moved back and forth from L to R settings.

The two oil pumps supply pressure necessary for the torque converter, hydraulic control system and lubrication, oil capacity of the complete unit being 11 quarts. Rear pump is required to operate the necessary clutches and bands when pushing the car to start the engine.

Added Acceleration—A kickdown from direct drive is provided for added acceleration. This is a resistance or detent under the accelerator pedal which is felt by the driver. When the pedal is moved beyond this resistance a downshift into intermediate gear is automatic. Under light throttle the automatic upshift from intermediate to direct takes place at about 18 mph, with the throttle wide open but not past the detent at 35 mph, and when depressed past the detent at about 58 mph.

For cooling, outside air enters a duct located near the left front wheel housing and passes into the side of the converter bell housing. A blower on the converter shell spreads air over its entire surface, from where it is expelled through louvers in the lower pan located in the cover of the converter bell housing.

Step Forward—The transmission appears to represent an important step forward in the field, and those who have driven it report the device offers a high degree of flexibility and ease of manipulation. There is no "timing" of the shift from one gear range to another, the creep which has bothered some automatic transmission owners when engines are idling fast as in winter start-ups has been eliminated, and no separate oil lines and coolers are required as in other designs. The unit will be available on all Studebaker models at extra cost, just how much is not yet disclosed.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,966
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	604,351	489,736
August	678,092	478,186
September	657,078	437,181
October	601,021	516,814
November	456,320*	495,488
December		514,337
12 mos.		5,549,323

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Nov. 26	76,026	89,482
Dec. 3	72,994	125,170
Dec. 10	53,982	124,041
Dec. 17	75,000	123,315

Estimates by Ward's Automotive Reports

New Chrysler Stamping Plant

CHRYSLER has disclosed a few details concerning its new 415,000 sq ft press plant at Nine-Mile and Mound roads, just outside Detroit. Providing an increase of 25 per cent in the corporation's steel stamping capacity, the plant was designed to give maximum flexibility to the installation and movement of heavy press equipment. An open basement is provided underneath the areas in which presses are set, with the weight of the presses carried on steel beams located below the work floor. To move a press or add a new one it is necessary only to remove sections of laminated timber flooring and with the use of the plant's 50-ton cranes move the press in sections to a new location.

Now in operation are 45 presses,

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ranging in size from two large 900-ton triple-action units down to 10-ton single-action types. The two largest occupy a floor area of 12 by 24 feet and stand 15 feet above floor level and 18 feet below it. They utilize dies weighing 75 tons. In addition to the stamping equipment, the plant also contains a die shop, capable of producing the largest dies used in automotive fabrication.

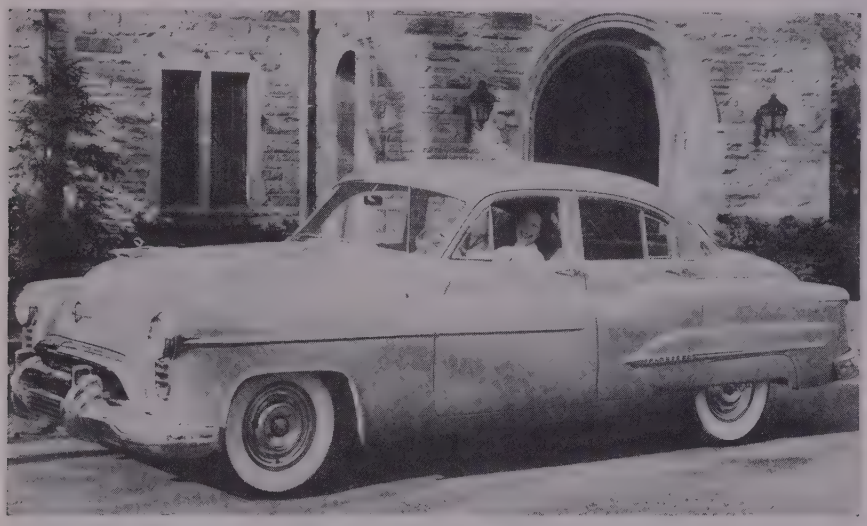
Olds Shows New Models

OLDSMOBILE previewed its three new lines in Lansing last week, giving the first official peek at the new General Motors "C" body. It is lower and wider than anything Fisher Body has yet produced, and in respect to sheet metal follows the style set by the Buick Special. In one design, however, the rear window is carried well around into the rear quarter, as has been done in the steel-top sport sedan introduced earlier this year by Buick, Olds and Cadillac. This has made it necessary to dispense with the ventilator window at the rear and to relocate it as a part of the window in the rear door. In a second version of the "C" body the ventilator window remains as it was, having a pillar no wider than the windshield pillar to support the roof, thereby virtually eliminating altogether blind spots in rear quarters which have characterized automobiles almost since their inception.

One-Piece Windshields — Another feature of the new bodies is a change to a one-piece curved glass windshield, doing away with the center dividing strip. This doubtless marks the start of single-piece windshield glass in all General Motors bodies and likely has meant some headaches for glass suppliers, since it is no simple problem to control the curvature of these heavy pieces and keep them to uniform shape. There is also the problem of mounting, since the glass has to float in a rubber sealer strip retained in the steel frame. If the fit is not good, water leaks develop, and this has been one of the principal service complaints experienced since introduction of curved rear windows and windshields.

Prices Cut—Olds also made the surprise announcement of $55 to $65 reductions in price of its Series 88 models, now carrying the "B" body which first appeared on the Buick Special. Coupled with a $25 reduction in the charge for Hydra-Matic drive, this was calculated to be good news to prospective buyers.

A new final assembly plant covering 500,000 sq ft is now functioning at Lansing which helps to boost Olds capacity to 350,000 annually. With a few changes which could be worked out in a matter of weeks, this could be raised to 450,000, should "the market" justify such a move.



ONE OF OLDSMOBILE'S THREE NEW MODELS
. . . lower and wider than anything Fisher Body has yet produced

New Engine for Super

A NEW high-compression (7.2 to 1) engine known as the F-263 will be introduced by Buick on its Super or Series 50 models early in January. A valve-in-head straight eight, the same as previous Buick engines, the new power plant develops 128 bhp at 3600 rpm, with 3-3/16 inch bore and 4⅛ inch stroke. Despite increase in horsepower from 120 to 128, weight is unchanged. The F-263 is more compact than its predecessor, block-crankcase height being decreased by ⅝ inch. Connecting rods are ¼ inch shorter, piston length has been cut 9/16 inch, ⅜ inch of this above the piston pin. Crankshaft has one uniform diameter for all bearing journals, instead of five different diameters as before. With the one diameter of 2-9/16 inches, the number of crankshaft bearing liners required remains the same, but only four different style pieces are needed for a set instead of ten, simplifying both assembly and service and at the same time improving shaft rigidity.

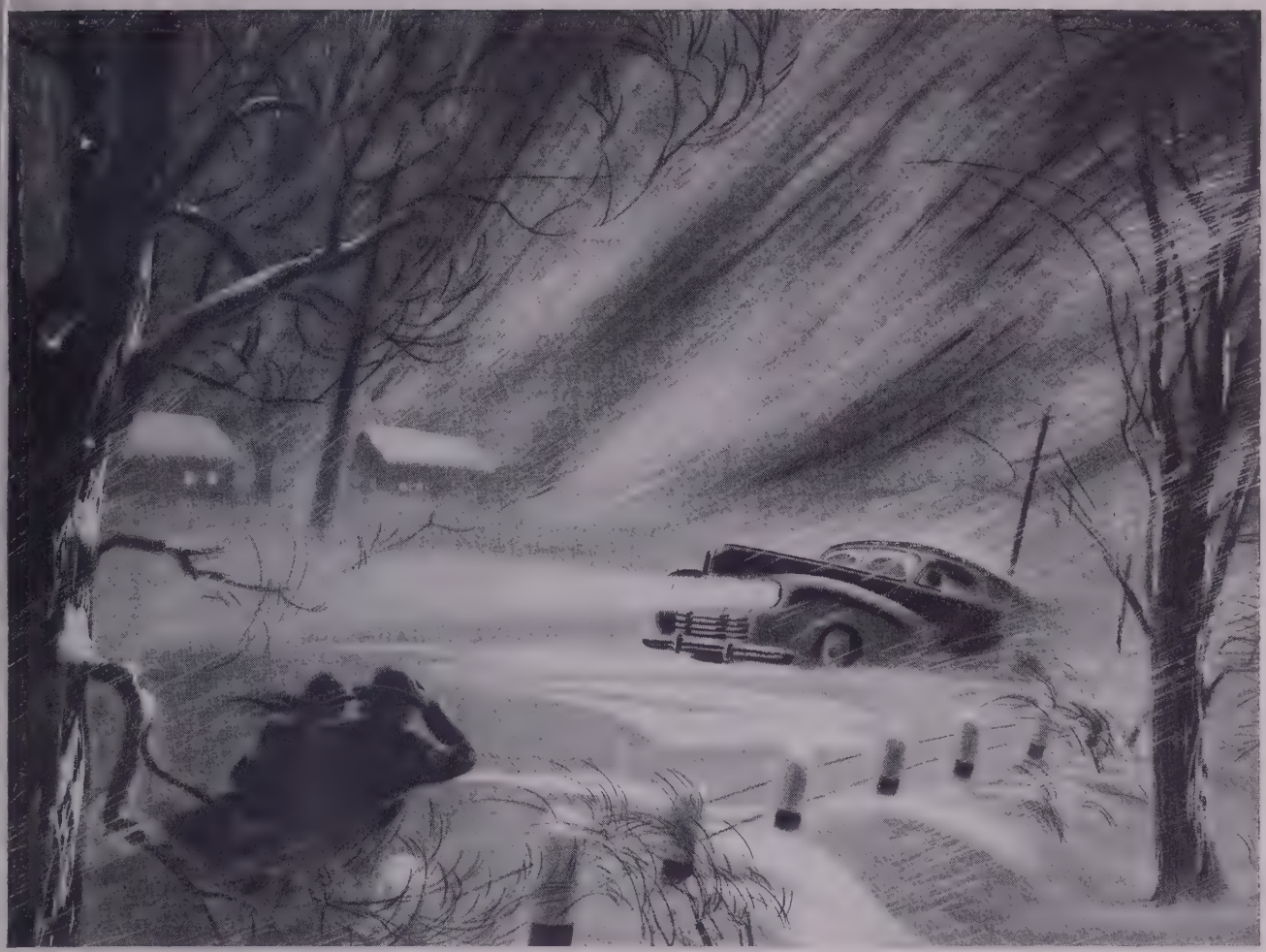
Greater breathing capacity is given by an increase of ⅛ inch in the throttle bore of the carburetor, the same increase being made in the intake manifold and riser. Hydraulic valve lifters contribute to smoothness and quietness, particularly during warm-up. Speed of the cooling fan has been reduced and projected height of the fan has been increased from 1⅝ to 1⅞ inches. Overall clean-cut appearance has been aided by compact mounting and rearrangement of exterior fittings and accessories. Air cleaner support bosses have been removed from the intake manifold, the cleaner now being mounted crosswise and supported by a bracket from the rocker arm cover.

No Radical Change — While embodying many new features the F-263 marks no sharp break from tradition in the building of Buick engines, such as was taken by Oldsmobile and Cadillac when they started manufacture of entirely new V-8 overhead-valve engines. Rather it is a further refinement of a basic design, suggesting that it may be a few years before Buick will venture to the V-8 field. From the looks of things now, however, and on the basis of experimental work in progress, there is coming a wholesale shift to V-type overhead value engines. Nearly every company has such engines on test, some eights and some sixes.

Production has started at Flint on 1950 Buick Super four-door and two-door models with the new engine. Assemblies also are under way on the Roadmaster four-door and two-door sedans. Other new models in these two series, four in all, will be on the lines later this month. Meanwhile the Series 40 or Special model is being turned out at a high rate, since few changes were made in styling introduced last August.

Wholesale Discount on GM Parts

GENERAL MOTORS hopes to provide greater availability of parts to 16,318,000 users of GM vehicles. The company will grant an over-riding wholesale discount to GM car and truck dealers and distributors on GM parts sold at wholesale.



There Go 3269 Fasteners!

Tonight's test is tough . . . Doc Smith must get through . . . he's depending on the miracle of American mass production and (unknowingly) on the 3269 fasteners that give his car strength and stamina.

Over 500 screws . . . 331 nuts . . . 400 bolts . . . hundreds of rivets . . . furnish the forces that lock automobile assemblies together.

With this responsibility that fasteners must carry, it is obvious that quality is essential. That's why Russell, Burdsall & Ward makes the huge investment it does—in wire drawing mills of its own, in wire preparation, in laboratory equipment for extensive research, in advanced designs of equipment—all of which contribute to quality control.

Fastener *quality* and production savings go hand in hand. It isn't the initial price but the cost of *using* fasteners that counts. *T*rue *F*astener *E*conomy lies in *saving* assembly time, *reducing* the need for plant inspection, *getting* maximum holding power per dollar of fastener cost.

True Fastener Economy contributes to the kind of production savings that puts millions of new cars in U. S. driveways every year. It is this type of contribution to major American industries that explains why—for over 104 years—RB&W has been *making strong the things that make America strong.*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

RB&W

Plants at: Port Chester, N.Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Oakland, Portland, Seattle. Distributors from coast to coast.

3269 Fasteners are used in 1 small American car

104 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Squelching Static

Burroughs Adding Machine Co. completes laboratory to eliminate radio interference

ONE COMPANY, at least, isn't static about eliminating radio noises caused by incidental electrical equipment and devices.

Burroughs Adding Machine Co. completed an entirely new copper-insulated test facility in its Detroit engineering laboratories. It is to be used for testing of electrical equipment for interference with radio and television reception.

The company anticipates not only doing its own basic research work in wiping out radio and television interference, it also will be in a position to do similar testing work for other concerns not equipped with a satisfactory laboratory.

The new facility is completely encased in copper with an outer layer of galvanized iron. The entrance is protected by two rollup screens, one of iron, the other of copper. Fresh air is forced through a screened opening in the ceiling. Various types of electrical equipment that can be tested include: Switches, motors, x-ray machines and auto ignition systems. The "copper room" will bar the entrance of any electrical waves, radiating from the surrounding area. Inside is a silence free of radio interference.

Sensitive electronic measuring instruments, known as radar field intensity meters, will be used to pick up any radio waves generated by machines being tested. The meters measure the waves in millionths of a volt. Since radio waves may be transmitted over many frequencies, the instruments that will be used will be able to measure frequencies ranging from 150 to 400,000 kc. Radiations of certain machines must often be held as low as 2 millionths of a volt and if they emit waves of greater intensity, they must be equipped with special shields to prevent interference.

Firm Goes North of the Border

BELIEVING that "Canada is an expanding industrial frontier" and wanting "to be first in the field there," Cleveland Graphite Bronze Co. formed a Canadian subsidiary, Clevite Ltd.

Clevite has already bought a factory at St. Thomas, Ont. Its employees will produce sleeve-type automotive engine bearings early in 1950. The subsidiary will inaugurate a new manufacturing industry for Canada.

Up to now our northern neighbor has imported all requirements for such bearings. Cleveland Graphite Bronze for some time has been shipping its products at a $700,000-a-year rate to Canadian customers. Much of that business will be transferred to the new company.

John W. Dixon, vice president and treasurer of Cleveland Graphite Bronze, is president of Clevite. William H. Martin, until now manager of the branch factory at Bridgeport, O., will go to St. Thomas as general manager.

"In addition to its motor car producers, Canada has many industries that we can serve from our Canadian plant," says Mr. Dixon. It will reduce Canada's requirements for U.S. dollars and increase the Canadian-built content of automobiles. Clevite's original output will be main and connecting rod engine bearings fabricated from coated metal strip supplied by the parent company.

The Canadian venture is the third expansion move taken by Cleveland Graphite Bronze in the last seven months: The company bought Harris Products Co. in May and Monmouth Products Co. in August.

Contracts for Brazil's "TVA"

AN AGREEMENT covering the first phase of Brazil's "TVA" was concluded between Comphania Hidro-Electrica do Sao Francisco and Westinghouse Electric International Co.

The agreement calls for supplying $4,209,000 of electrical and mechanical equipment: Two 60,000 kw generators, waterwheels, valves, transformers, head gates and tainter gates. The apparatus will be installed in the first of five power stations at Paulo Afonso falls in northeastern Brazil. The project is part of a larger development for the San Francisco valley. Throughout the vast region, Brazilian officials plan to carry out flood control, irrigation, rural electrification and industrial and agricultural development. At present most industry and commerce is centered in Sao Paulo and Rio de Janeiro.

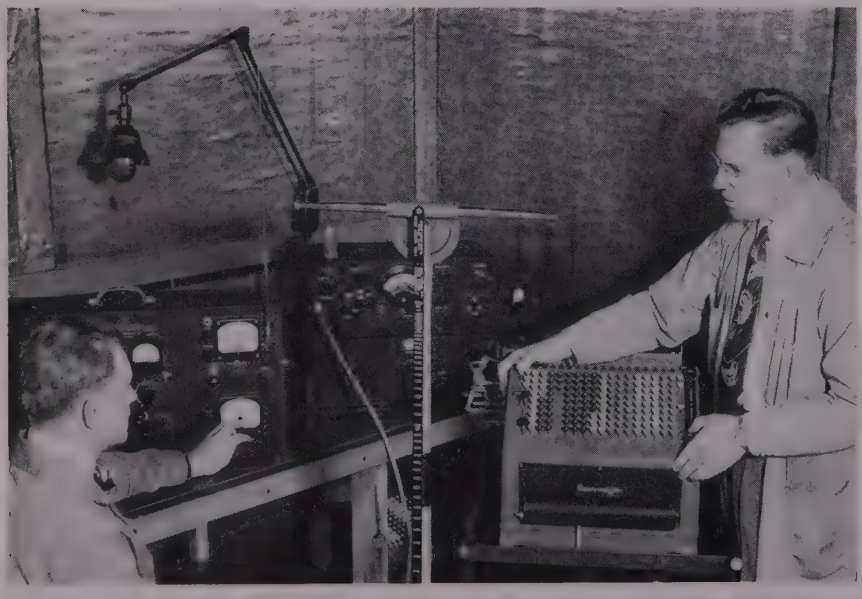
GE Expands Pittsfield Facility

EXPANSION of General Electric Co.'s transformer manufacturing and testing facilities at Pittsfield, Mass., will more than double the company's power transformer capacity.

The new facilities, says Robert Paxton, manager of GE's Transformer and Allied Products Division, will cost several million dollars and are expected to be completed by mid-1950. They will permit testing, assembling and shipping of three-phase power transformers with more than twice the capacity of any transformers yet built, says Mr. Paxton.

Construction of a huge new addition—high as a nine-story building—will increase floor space by 60,000 sq ft.

It will be the highest structure in Pittsfield. Two giant 250-ton cranes, two 50-ton cranes and several smaller ones will be installed in the addition. Glass and steel sash will form most of the exterior walls for the building. A large test pit at the north end of the building will cover one-quarter of the building space.



TEST FACILITY OF BURROUGHS ADDING MACHINE CO.
. . . completely encased in copper

Briefs . . .

eynolds Metals Co., Louisville, amed Milton A. Meier Co., Detroit, istributor for Reynolds aluminum ig and ingot products. Meier will over the Detroit area, the southern alf of Michigan, and Fulton, Wilams, Ottawa and Lucas counties in orthern Ohio.

—o—

Michel & Pfeffer Iron Works Inc. is etting contracts for a new $500,000 steel and concrete building in South San Francisco. Within the next year the company plans to move all of its operations, now located in San Francisco, to the new site. The firm manufactures light steel buildings (prefabricated service stations), fire escapes and ornamental and miscellaneous iron, bronze and aluminum products.

—o—

Universal Cooler Co. of Canada, Brantford, Ont., was sold to Dan Robertson, Marion, O., and associates. Purchase price was not disclosed. The company will be known as Universal Cooler Co. Ltd. Mr. Robertson is president and general manager.

—o—

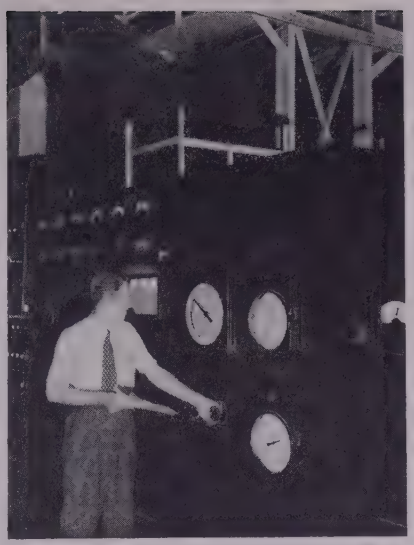
Morrison Industries Inc., Cleveland, organized by a group of men experienced in the oven, furnace and wire equipment field, offers engineering, construction and installation service on: Industrial ovens and finishing systems, industrial furnaces, conveyor systems, wire enameling and lacquering equipment, wire spooling and level wind takeup machines, direct spooling from wire drawing machines, and wire and rod bakers.

—o—

J. H. Day Co. Inc. was formed to acquire for about $4.5 million the J. H. Day Co., Cincinnati, manufacturer of baking machinery since 1887. President of the new firm is Martin H. Miller who resigned as vice president of American Machine & Foundry Co., New York. The Day plant, now employing 400, will remain in Cincinnati.

—o—

Allegheny Conference on Community Development, Pittsburgh, made a study that presents for the first time in graphic form statistical material on industry in the Pittsburgh area. Made possible by co-operation of Pennsylvania's Department of Internal Affairs, it incorporates 1948 information well in advance of its availability from any other source. Arrangement of the study (charts show information for the four-county area: Beaver, Allegheny, Washington and Westmoreland counties) enables business and industrial executives to see growth of Pittsburgh industry in the last ten years.



A TWIST OF THE WRIST: And this electrolytic plating turn foreman can be sure his tin plate will have exactly the coating weight specified in his order—and uniformly thick. The new plating thickness meter is being installed in all U.S. Steel Corp. plants. It was developed by Carnegie-Illinois Steel Corp., U.S. Steel subsidiary

—o—

Herman H. Sticht Co. Inc., New York, was appointed sole United States representative for Electric Instruments Ltd., Richmond, Surrey, England. Sticht will distribute the new model 29 20-million megohmmeter, an instrument designed for precise measurement of electrical resistance over a range from 300,000 ohms to 20 million megohms.

—o—

The American Chemical Society will establish an award for outstanding achievement in the teaching of chemistry. It is to be known as the James F. Norris Award, honoring Mr. Norris who was an authority on organic chemistry and twice was president of the society.

—o—

Work is to begin early this week on a $250,000 plant that **Clare Steel Corp.** of Detroit will build in Middletown, O. J. H. Karlet, president, and J. M. Kratze, treasurer, of the company say the plant will manufacture parts for the automotive industry. Eventually 250 persons will be employed.

—o—

Although **Milwaukee Road's** car shops in Milwaukee are planning to build no more than a handful of special cars in 1950, it does not mean a shutdown. So says J. A. Deppe, department superintendent. The carbuilding shop is expected to maintain employment at 1684 men, a drop of almost a thousand men from 1948 when the building program was at its peak.

—o—

Symington-Gould Corp., Rochester, N. Y., bought all outstanding capital stock of Martin & Schwartz Inc., Salisbury, Md., for $2 million. Stock was acquired from Socony-Vacuum Co. Inc., Standard Oil of Indiana, Sun Oil Co. and Continental Oil Co. The four gasoline companies have agreed to buy a guaranteed quantity of gasoline pumps from the purchaser, says Chairman C. J. Symington.

—o—

Black & Decker, Towson, Md.—portable electric tools—moved its Atlanta factory sales and service branch to a new building at 316 Techwood Dr. N.W., Atlanta. The brand new building offers increased facilities for servicing of Black & Decker, Van Dorn and Home-Utility products. A. Lee Proctor is branch manager.

—o—

Olin Industries Inc., East Alton, Ill., completed a new metallic annealing building. It will replace old equipment and will be used to anneal and wash ammunition and brass specialty products.

—o—

Soss Mfg. Co., Detroit, installed its sixth production line for automobile hinges, says Charles J. Soss, president. The line increases the company's production to a new peak.

—o—

Crittall Inc. is now the name of Crittall-Federal Inc., Waukesha, Wis.—metal windows and doors. Purpose of the change was to create brevity and simplicity in use of the company's official title.

—o—

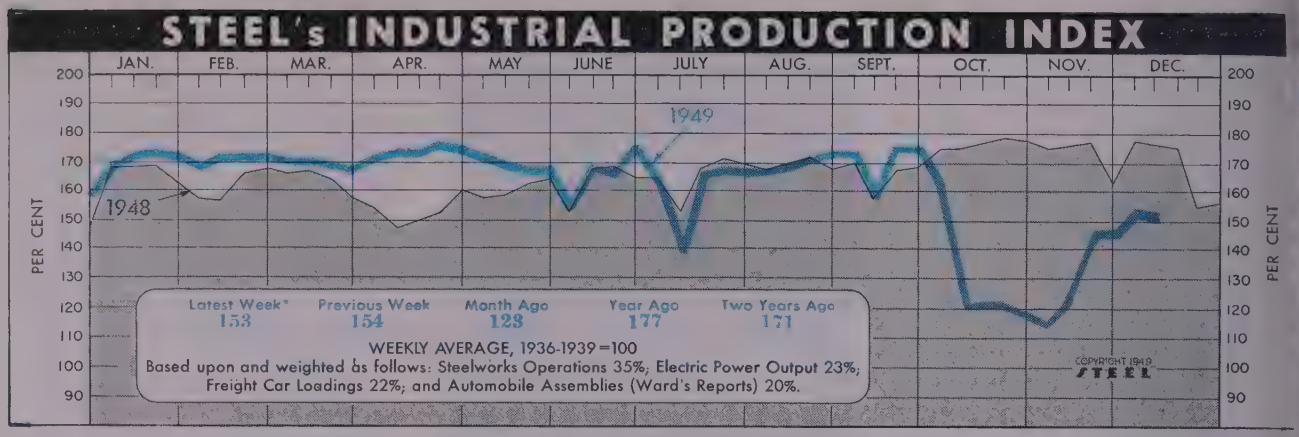
Ninety-one members of **Oliver Iron & Steel Corp.'s** Service Club were awarded emblems by Theodore F. Smith, president, at a service recognition ceremony. Oliver is in Pittsburgh.

—o—

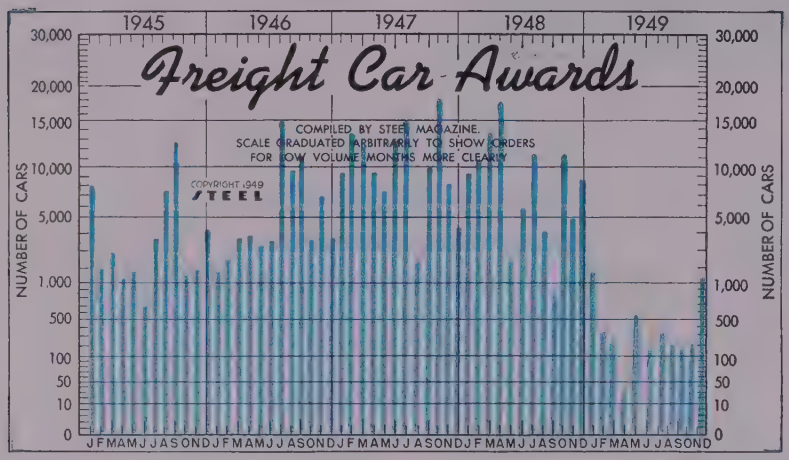
Size Control Co.—precision gages, centerless lappers—**and Walsh Press & Die Co.**—punch presses, safety devices—opened new offices in Cleveland. The two companies are divisions of American Gage & Machine Co., Chicago. Hugh G. Collins and Wallace W. Denhoff are in charge of sales and service in Ohio. Size Control also appointed Joseph A. Batlle & Co. as its exclusive representative in metropolitan New York.

—o—

Electric Products Co., Cleveland—motors, generators, battery chargers, controls, frequency changers—named William E. Brice Co., Houston, representative for southern Texas.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1949
1948
PER CENT
Latest Week* 153
Previous Week 154
Month Ago 123
Year Ago 177
Two Years Ago 171
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
COPYRIGHT 1949 STEEL

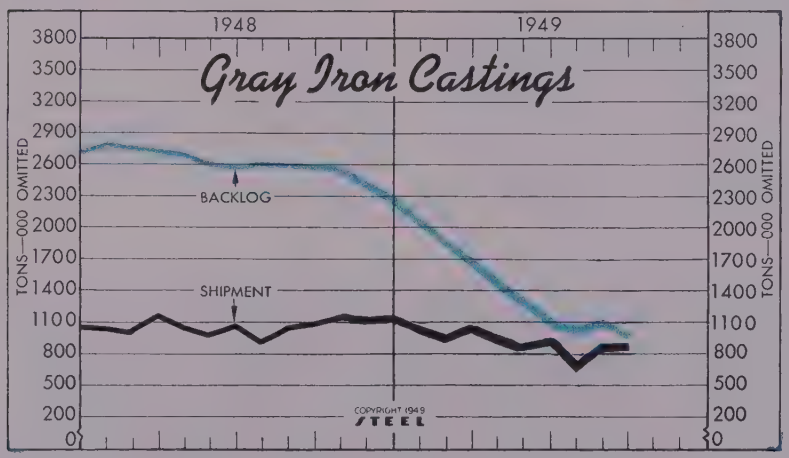
*Week ended Dec. 10 (preliminary).


1945 1946 1947 1948 1949
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1949 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Freight Car Awards

	†*1949	*1948	*1947	*1946	1945
Jan. ..	1,663	8,613	9,222	1,481	7,200
Feb. ..	332	10,698	13,724	2,328	1,750
Mar. ..	199	13,227	12,048	4,512	2,500
Apr. ..	30	17,215	9,186	3,564	1,120
May ..	589	2,228	7,389	2,900	1,526
June ..	153	5,368	12,784	3,335	670
July ..	408	11,308	14,840	14,836	3,500
Aug. ..	185	3,638	2,352	9,527	7,240
Sept. .	123	738	9,917	11,102	12,840
Oct. ..	201	10,931	17,737	3,407	1,320
Nov. ..	1,145	4,852	8,079	7,190	1,650
Dec. ..	....	8,368	4,030	3,011	4,116
	....				
Total .	....	97,184	121,308	67,193	45,432

* American Railway Car Institute.
† Preliminary.

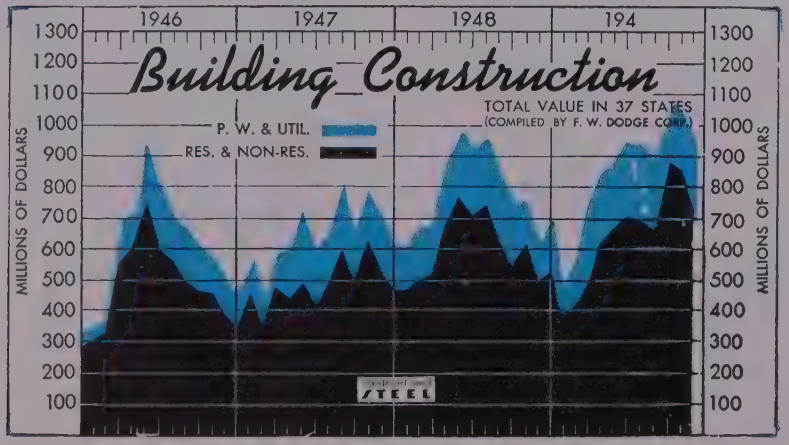


Gray Iron Castings

(U. S. Bureau of Census)

	Tons—000 omitted Shipments		Backlogs*	
	1949	1948	1949	1948
Jan.	1,040	1,064	2,065	2,803
Feb.	987	1,024	1,857	2,769
Mar.	1,075	1,169	1,639	2,726
Apr.	929	1,051	1,446	2,691
May	867	993	1,243	2,602
June	906	1,072	1,087	2,587
July	697	914	1,032	2,601
Aug.	872	1,051	1,048	2,599
Sept.	881	1,088	980	2,587
Oct.	....	1,148	....	2,523
Nov.	....	1,100	....	2,407
Dec.	....	1,111	....	2,284
Total	....	12,786		

* Unfilled orders for sale to the trade.



Construction Valuation in 37 States

(Unit—$1,000,000)

	Total	Public Works, Utilities		Residential and Non-residential	
	1949	1949	1948	1949	1948
Jan.	483.0	102.0	136.6	381.0	478.6
Feb.	568.5	153.5	177.3	415.0	504.6
Mar.	747.6	168.4	164.3	579.2	525.5
Apr.	842.6	222.4	184.7	620.2	689.2
May	880.3	213.5	205.0	666.9	765.8
June	945.7	239.0	215.7	706.7	719.5
July	943.6	252.7	217.9	690.9	744.8
Aug.	905.7	234.3	207.8	671.5	646.3
Sept.	1,093.7	223.1	202.7	870.6	559.5
Oct.	1,061.8	204.0	165.5	857.8	613.1
Nov.	957.8	256.4	106.9	701.3	504.3
Dec.	....	....	170.9	....	523.1
Total	....	....	2,155.3	....	7,274.4

The Business Trend

RISE of STEEL's industrial production index was checked in the week ended Dec. 10 despite another increase in the steelmaking rate. The index receded 1 point from the level of the preceding week to a preliminary 153 per cent of the 1936-1939 average.

AUTOMOBILES—Another drop in passenger car and truck assemblies to 53,982 units in the week ended Dec. 10 from 72,994 in the preceding week was the prime reason for the index's decline. The industry's output in the latest week was the lowest since mid-1946 except for one intervening holiday week. Reversal of the downtrend in automotive assemblies is expected to begin during the current week as builders swing into production of 1950 models and bring their steel stocks into balance. Output up to Dec. 10 in U. S. plants is 4,889,000 passenger cars and 1,073,500 trucks, plus 178,000 cars and 95,500 trucks from Canadian plants. In the corresponding 1948 period the U. S. total was 3,695,500 and 1,316,000. Dominion factories added 152,000 and 95,500.

STEEL—Output of steel for ingots and castings continued its upward movement in the week ended Dec. 10 to 93 per cent of capacity from 89.5 per cent a week earlier. This marks the highest level of operations since the last week in May. The steelmaking rate was expected to rise slightly during the week ended Dec. 17.

CONSTRUCTION — Civil engineering construction awards jumped to $302,115,000 in the week ended Dec. 8, second best weekly total in the postwar period. The steep rise in contract awards from $219,647,000 in the preceding week was due mainly to an award of $162 million for an Atomic Energy Commission plant in Oak Ridge, Tenn. Heavy engineering construction volume aggregated $589.2 million in November, bringing the volume for the first 11 months of this year to $7293 million, 17 per cent higher than in the same 1948 period.

COAL—Bituminous coal output slumped to 9,260,000 tons in the week ended Dec. 3 from 12,650,000 tons a week earlier, as the miners' full work-week period came to an end. Work continues on a three-day week basis and production will continue below normal until contract difficulties are resolved between the mine operators and United Mine Workers.

CARLOADINGS—Reduced mining operations had an immediate effect on freight carloadings. Despite an increase in all other categories, loading of all revenue freight was up only 29,368 cars over the preceding holiday affected week because of a 23,617-car decrease in coal loading. Total loading of 693,923 cars in the week ended Dec. 3 represents an increase over the 664,555 cars for the preceding week but is 13.7 per cent below the 804,172 cars loaded in the like week in 1948.

PRICES—Bureau of Labor Statistics wholesale price index declined 0.3 per cent in the week ended Dec. 6 to 151 per cent of the 1926 average. The index is 0.3 per cent below four weeks earlier and 7.4 per cent below the comparable week in 1948.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	93.0	89.5	24.0	100.00
	Electric Power Distributed (million kilowatt hours)	5,881	5,743	5,435	5,705
	Bituminous Coal Production (daily av.—1000 tons)	1,543	2,108	447	1,969
	Petroleum Production (daily av.—1000 bbl)	4,979	5,105	5,185	5,671
	Construction Volume (ENR—Unit $1,000,000)	$302.1	$219.6	$111.3	$83.7
	Automobile and Truck Output (Ward's—number units)	53,982	72,994	114,856	124,041
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	685†	694	636	783
	Business Failures (Dun & Bradstreet, number)	191	221	222	122
	Money in Circulation (in millions of dollars)‡	$27,699	$27,542	$27,528	$28,415
	Department Store Sales (changes from like wk. a yr. ago)‡	−8%	−5%	−2%	−5%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,854	$11,265	$11,234	$14,001
	Federal Gross Debt (billions)	$256.9	$257.0	$256.8	$252.4
	Bond Volume, NYSE (millions)	$20.7	$23.0	$12.2	$16.6
	Stocks Sales, NYSE (thousands of shares)	8,781	8,315	4,317	6,281
	Loans and Investments (billions)†	$66.8	$66.7	$66.7	$62.3
	United States Gov't. Obligations Held (millions)†	$37,257	$37,430	$37,388	$33,075
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	152.52	152.52	152.52	151.86
	STEEL's Nonferrous Metal Composite‡	162.4	164.0	171.6	232.6
	All Commodities†	151.0	151.4	151.5	163.1
	Metals and Metal Products†	168.9	169.2	169.3	173.7
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

Men of Industry

EDWIN R. JUNG

NEELE E. STEARNS

CHARLES E. RICE

Edwin R. Jung has been appointed general sales manager of **Clark Controller Co.,** Cleveland. He has been with the company for 22 years, and was for many years Atlantic Coast regional manager, with offices in New York. Mr. Jung went to the Cleveland home office as manager of industrial sales in 1947, later becoming assistant sales manager.

—o—

Frank A. Schotters, vice president in charge of operations at the **Trailmobile Co.,** Cincinnati, has resigned to accept a position as operations manager, Parts Division, Reynolds Metals Co., Louisville. Prior to his connection with Trailmobile, Mr. Schotters was vice president in charge of production at Crosley Corp., Cincinnati, and previous to that was works manager of Western Cartridge Co., East Alton, Ill., and a member of the executive staff of Olin Industries. He has also been president and general manager of Luce Mfg. Co., Lansing, Mich. He has 17 years' experience in the automotive parts industry and holds several patents on various processes and products for that industry.

—o—

Pfaudler Co., Rochester, N. Y., in carrying out its current sales expansion program, announces appointments of four sales executives: **Donald A. Gaudion** was named assistant to the president in charge of sales and advertising and was elected a director of General American-Pfaudler Corp.; **William H. Klee** becomes general sales manager and a director and vice president of Pfaudler Sales Co., West Coast subsidiary; **H. I. Edwards** and **Robert Van Iderstine** were appointed assistant sales managers.

Neele E. Stearns has been elected to the new office of executive vice president of **Inland Steel Products Co.,** a subsidiary of Inland Steel Co., Chicago. Mr. Stearns has been associated with Inland Steel Co. since 1940, and has served for the last several months as an acting vice president of Inland Steel Products Co., on leave of absence from his post as assistant general sales manager of the parent organization in Chicago. He relinquishes the latter post to take over his new duties in Milwaukee.

—o—

Spencer Thermostat Division of Metals & Controls Corp., Attleboro, Mass., announces the following changes within the organization: **E. P. Jastram Jr.** has been appointed chief engineer. He previously was a field engineer in the St. Louis branch. **C. A. Peterson,** formerly of the headquarters sales force, has taken over Mr. Jastram's duties as field engineer in St. Louis. **B. O. Haun Jr.** was appointed field engineer for a newly formed territory with headquarters in Dayton, O. Mr. Haun has specialized in refrigeration sales. In addition to managing the automotive and aircraft section of Spencer, **Jerry Ottmar** has also assumed the duties of sales promotion manager.

—o—

J. Robert Bunch has been appointed sales representative to assist **J. D. Alexander** in the Cleveland sales office of **American Wheelabrator & Equipment Corp.,** Mishawaka, Ind. Mr. Bunch joined the company in 1936. After spending nine years in various production departments, he has, for the last four years, supervised the erection and servicing of Wheelabrator blast cleaning equipment and Dustube collectors in the Cleveland area.

Charles E. Rice has been appointed general manager of sales by **Jessop Steel Co.,** Washington, Pa. He has been associated with the company in a sales capacity for seven years, and was previously manager of sales for the Pittsburgh territory. He had former association with Crucible Steel Co. of America, serving that company 22 years. **Eugene N. Lohre,** formerly assistant to the vice president in charge of sales, Jessop Steel, has been named assistant general manager of sales. He previously had been with Carnegie-Illinois Steel Corp., Stainless Steel Division, Chicago, and prior to that worked as a special engineer in the corporation's South Chicago works. **E. H. Dau** has been appointed manager of sales for the Pittsburgh territory, succeeding Mr. Rice. **Raymond R. Huffman** has been appointed assistant to the executive vice president. Prior to joining Jessop Steel Co. in 1946, he was associated with Continental Can Co. and Carnegie-Illinois Steel Corp.

—o—

American Cyanamid Co., New York, announces appointment of **Dr. Wilbur H. Miller** as technical representative and assistant manager of the company's Washington office. He will act as liaison between the various governmental laboratories and the American Cyanamid Co.'s technical facilities. Dr. Miller has been on the staff of Cyanamid's Stamford research laboratories since 1941.

—o—

Phil R. Becker has been appointed sales manager of the welding fittings division of **Midwest Piping & Supply Co. Inc.,** St. Louis. He joined the company ten years ago. In 1941 he

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became associated with the welding fittings division and, until 1945, worked in engineering and production control and with the government on allocations and priorities. Since 1945 he has devoted his entire time to sales in the welding fittings division.

—o—

Thomas C. Ford has joined **Pittsburgh Metallurgical Co.,** Niagara Falls, N. Y., and will handle sales in

THOMAS C. FORD

the Pittsburgh and Ohio areas, in association with **John T. Mechem,** eastern sales manager. His headquarters will be in Pittsburgh. Mr. Ford formerly was district sales manager of Electro Metallurgical Co. in the Pittsburgh territory.

—o—

A. H. Frampton, formerly general manager of **English Electric Co. of Canada Ltd.,** St. Catherines, Ont., has been appointed vice president and general manager of the company and elected to the board of directors.

—o—

L. I. Stead has been appointed chief chemist for Chicago district plants of **Youngstown Sheet & Tube Co.** He succeeds the late **Herbert McComb.** Mr. Stead joined the East Chicago, Ind., plant in 1918, and in 1936 was made assistant chief chemist.

—o—

Meyer Furnace Co., Peoria, Ill., announces promotions in and an addition to its management staff: **Russell S. Quimby** has been promoted from sales manager to general sales manager, and will direct all sales activities of the manufacturing divisions of the company. **Hugh C. Garver Jr.,** assistant to the president, will assume responsibility for private-brand, government and project sales. **Harold V. Walker,** who has returned to the company after two years with Indian Motocycle Co., has been appointed assistant sales manager. **Charles A. Raper** has been raised to advertising and sales promotion manager. **Ray W. Qualley,** chief product engineer, has been promoted to factory manager, in charge of the Peoria and Peru plants. **John J. Boland,** chief application engineer, will now supervise product design work.

—o—

Hertner Electric Co., Cleveland, announces appointment of **Glenn W. King** as district representative in southeastern Texas, and **Horace B. Hanson** as district representative in Arkansas, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Louisiana, Mississippi and Florida territories. They will be in charge of Hertner's motor, motor-generator battery - charger, motor - generator sets, and control equipment business. Mr. King is located at 401 San Jacinto St., Houston, and Mr. Hanson at 700 Eighth Terrace West, Birmingham.

—o—

Joseph D. Flynn has been appointed manager of purchases and stores for **Midvale Co.,** Philadelphia.

—o—

John E. Harris has been appointed technical adviser to **B. T. Hain,** vice president for manufacturing, **National Radiator Co.,** Johnstown, Pa. He will handle technical problems and developments involving manufacturing processes at the company's plants in Johnstown, New Castle and Middletown, Pa., and at Trenton, N. J. Mr. Harris joined National Radiator in 1943 as plant superintendent of the company's plastic metals division in Johnstown. He had previously been superintendent of the electrode division of McKay Co., York, Pa.

—o—

Stuart A. Whitehurst has been appointed Pacific Coast representative of **Selas Corp. of America,** Philadelphia, consulting and manufacturing heat process engineer. During the last 27 years Mr. Whitehurst has been active in industrial designing and operation as well as in sales engineering. He will have headquarters at 11168 Santa Monica Blvd., Los Angeles.

—o—

Abraham Remstein has been appointed as a special representative in connection with the buying of white metal scrap and residues, **Federated Metals Division,** American Smelting & Refining Co., New York. Since 1924 Mr. Remstein has been superintendent of the manufacture of white metal alloys at Federated's Newark, N. J., plant. He has been associated with the company since 1914 and has served in various capacities in the buying and sales departments, and most recently served as assistant to the plant manager at Newark. He will continue to have headquarters in Newark.

—o—

Frank P. Wood, chairman of the board, and **George A. Morrow,** vice president and director, have resigned from **Burlington Steel Co. Ltd.,** Hamilton, Ont. Both have been senior officers of the Canadian company since its inception. **Graham Morrow** will succeed his father and **Robert S. Hart,** president of National Steel Car Corp. Ltd., will succeed Mr. Wood as members of the board of directors.

—o—

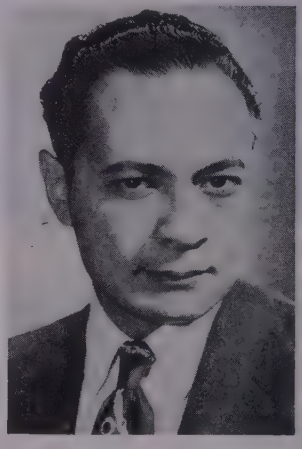
Sumner L. Young has been appointed purchasing agent of **American Bosch Corp.,** Springfield, Mass. He has been associated with the company since 1942, being formerly connected with Chapman Valve Mfg. Co., Indian Orchard, Mass. Since joining American Bosch Mr. Young has served in various engineering capacities, recently as section engineer in the fuel injection division, where he served to develop an important product standardization program.

—o—

Robert J. Cummins has been appointed sales manager of the western division of **J. H. Connor & Son Ltd.,** Ottawa, Canada.

—o—

Milton A. Karp has been appointed chief engineer of **Luria Engineering Corp.,** New York, designer and fab-



MILTON A. KARP

ricator of standard, steel-frame industrial, commercial and airport buildings. He will head Luria's enlarged engineering department, which is being moved to the company's expanding plant in Bethlehem, Pa. Mr. Karp was formerly chief engineer for Ellis Wing Taylor, West Coast indus-

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MAN-AU-TROL VERTICAL TURRET LATHES
SIX SIZES 30", 36", 42", 54", 64", 74"

MAN-AU-TROL HORIZONTAL LATHES
MODEL 30-H 3 SPINDLE

MULT-AU-MATIC Type "D"
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(NOT SHOWN)

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9½ TO 10¾ CAPACITY 6-8-12 OR 16 SPINDLES (NOT SHOWN)

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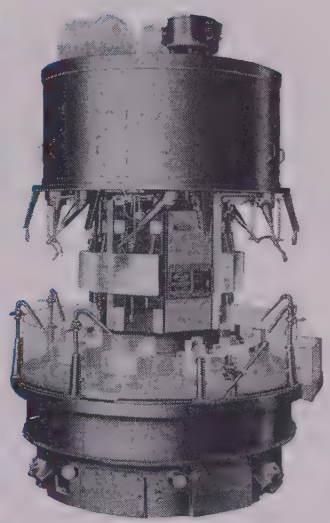

TYPE "D" MULT-AU-MATIC

BULLARD

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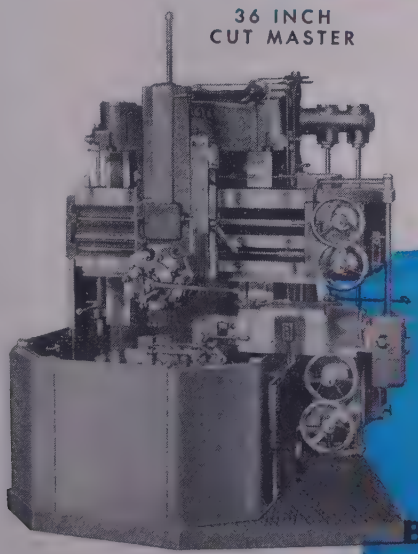
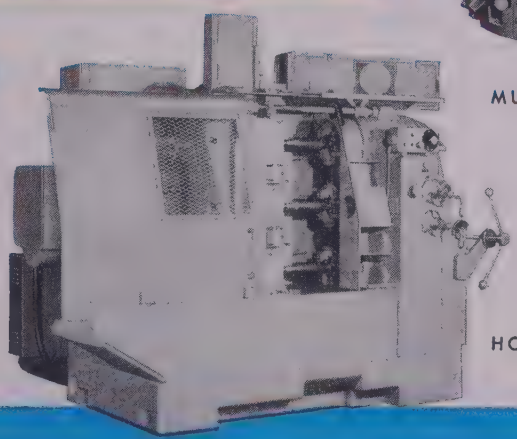




30-H HORIZONTAL LATHE

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

trial designer. **Peter A. Strobel,** vice president in charge of engineering, will continue to be located at the company's executive headquarters in New York.

—o—

Richard G. Slauer, manager of the applications laboratory, **Sylvania Electric Products Inc.,** Salem, Mass., has been elected to the grade of Fellow in the Illuminating Engineering Society in recognition of his outstanding work for the society and the art of illumination.

—o—

William J. Phalen, Chicago district manager of the mid-western territory for **Buffalo Bolt Co.,** retired Dec. 1. He had 45 years of service with the company and is replaced by **Clarence E. Zettel,** who has been transferred from the New York office, and who has had over 20 years' service with the company.

—o—

Frank M. Lewis has been appointed district representative for the Pittsburgh trading area for the construction materials department, **General Electric Co.** Mr. Lewis, formerly with the H. Lee Reynolds Co., Pittsburgh, will take over field assignments for G-E wire and cable, wiring devices, and conduit products. He will make his headquarters at 2144 Oliver Bldg., Pittsburgh.

—o—

Erie Railroad, Cleveland, announces the following promotions: **Stanley F. McGranahan,** assistant general manager, assigned to the eastern district with headquarters in Jersey City, N. J.; **J. Philip Allison,** assistant general manager, western district, Youngstown; and **Harry A. Bookstaver,** superintendent, New York division, Jersey City, N. J.

—o—

Everett P. Russell has been named director of sales and customer relations for **Texas Gas Transmission Corp.,** New York. He formed the Russell Organization Inc. in the early 1930s, and the Russell Engineering Corp., and has been active in architectural and engineering work for many years. His work has been devoted to plant site surveys, appraisals and management activities. **A. L. Roberts** was named general superintendent of Texas Gas Transmission Corp.'s pipe line system, and **H. L. Stowers** was appointed chief engineer for the company.

—o—

Terrance Hanlon, manager of the Buffalo branch of Luria Bros. & Co. Inc., has been elected president of the Buffalo chapter of the **Institute of Scrap Iron & Steel Inc.** He had been vice president of the chapter.

—o—

Dr. Karl Klotter, professor of mathematics at the University of Karlsruhe in Germany, has been appointed acting associate professor of mechanical engineering at **Stanford University,** Stanford, Calif. Dr. Klotter's specialty is the application of mathematics to engineering problems involving vibration. He will be engaged in nonlinear mechanics research sponsored by the Office of Naval Research and the Air Services.

—o—

E. B. Cleborne, executive vice president, **Allegheny Ludlum Steel Corp.,** Pittsburgh, has been elected president to succeed **H. G. Batcheller,** who was elected chairman of the board. Mr. Cleborne in turn is succeeded by **Edward J. Hanley,** vice president in charge of finances and treasurer. **Clark W. King,** vice president, was elected treasurer succeeding Mr. Hanley in that position. **T. Ames Wheeler,** manager of the cost and statistics department, was elected to the newly created office of controller. Effective with these elections the company accepted resignations of **Messrs. William E. Ruder and John W. Belanger** as directors, which, with the death of **James O. Carr** earlier in the year, created three vacancies. Mr. King was elected to one of the vacancies, a second was filled by **Russell M. Allen,** vice president in charge of sales, and the other was filled by **William J. Kyle,** partner in the law firm of Smith, Buchanan & Ingersoll. Mr. Ruder has been a director since 1933 and Mr. Belanger has served on the board since June, 1949. Mr. Cleborne, the new president, has been a director of Allegheny Ludlum since 1935. He became a vice president in 1938 and executive vice president in 1947.

E. B. CLEBORNE

Fairbanks, Morse & Co., Chicago, announces changes in its sales organization as follows: **J. A. Cuneo,** formerly branch manager, Los Angeles has been transferred to Chicago to assume duties of manager of the Chicago branch, and is succeeded in Los Angeles by **A. M. McLaren. John S. King,** formerly manager of the Chicago branch, has been moved to Cincinnati as branch house manager of that sales area. He succeeds **J. S. Peterson,** who has been transferred to Chicago where he will be attached to the sales manager's office. **William H. Kingsley,** who has for the last 12 years been district manager of the New York office of Ideal Electric & Mfg. Co., has joined the Fairbanks-Morse organization to become manager of the electrical division, with headquarters in the company's executive offices in Chicago.

—o—

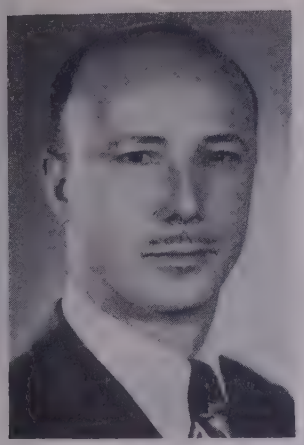
Robert F. McKaig has been added to the sales and service staff of **American Silver Co. Inc.,** Flushing, N. Y. He will make his headquarters in the Providence, R. I., office. Mr. McKaig has been identified with gold filled and rolled gold plate manufacturing for over 16 years, and will assist manufacturers with many of the technical problems connected with fabrication of these metals.

—o—

John A. Slenker has been named manager of operations of the Duluth district of **American Steel & Wire Co.,** Cleveland, to succeed **L. J. Westhaver,** who has been appointed manager of operations of Geneva Steel Co., another U. S. Steel Corp. subsidiary, at Geneva, Utah. Succeeding Mr. Slenker as general superintendent of the Duluth Works will be **Clarion A. Purbaugh,** formerly division superintendent, open hearth. **Keith H. Moody** has been appointed to succeed Mr. Purbaugh.

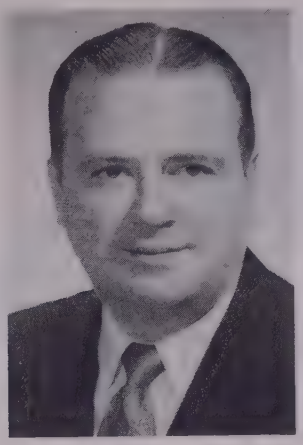
—o—

Raymond K. Serfass has been named assistant general sales manager of **York Corp.,** York, Pa. He takes over this position from that of industrial sales manager of the North Atlantic district, with headquarters in New York, a position he has held since 1945. In addition to the administrative and executive functions of his new position, Mr. Serfass will, in the absence of **John R. Hertzler,** vice president and general sales manager, assume the authority and make such decisions as would ordinarily evolve upon the general sales manager. He is succeeded as industrial sales manager, North Atlantic district, by **Alvin N. Barnes Jr.,** who has been a York sales engineer for 30 years.



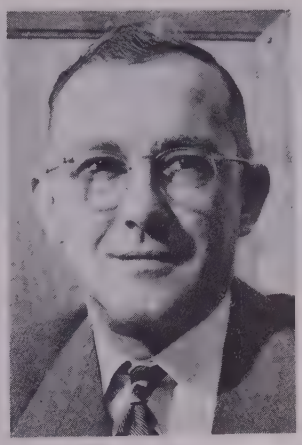
FRED L. HOPF

Appointed general manager of Dynamatic Corp., Kenosha, Wis., subsidiary of Eaton Mfg. Co., Cleveland. Noted in STEEL, Nov. 28 issue, p. 48



C. S. FRENCH

Appointed to the newly created post of assistant general sales manager, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif. Noted in STEEL, Dec. 12 issue, p. 76



FRANK KAZDA

Appointed vice president in charge of purchasing, Admiral Corp., Chicago. He has been with the company since 1934. Noted in STEEL, Dec. 12 issue, p. 78

OBITUARIES...

Harry J. Merrick, 46, executive secretary of the **Cutting Tool Manufacturers Association,** Detroit, died Dec. 12 at his home in Grosse Point, Mich. From 1930 to 1943 he operated a general legal practice in Detroit, also serving as public administrator for Wayne county from 1935 to 1937. He was appointed to the National War Labor Board, Region II, in 1943, serving as public panel member and arbitrator. He also was assistant director of disputes and regional attorney for the WLB. He left the War Labor Board in 1944 to become executive secretary of the CTMA when that association was formed.

—o—

Harold Harvey, 64, founder and president of **Harvey Metal Corp.** of Chicago, died Dec. 3 in Santa Monica, Calif. Mr. Harvey, a pioneer in the aluminum and brass forging industry and originator of various processes in the forging of nonferrous metals, was the first president of the Brass Forging Association and was one of the first vice presidents of the Aluminum Association.

—o—

George E. Hirst, 55, treasurer, **Hamilton Steel Co.,** Cleveland, died Dec. 8 after a short illness. Prior to his association with Hamilton Steel which commenced in 1942, he was associated with Bryant Heater Co. and with Standard Products Co. of which he was treasurer.

—o—

Anthony R. Smith, 54, president and general manager of **Elyria Metal Products Co.,** Elyria, O., and former general manager of Niles Steel Products Co., died Nov. 25.

—o—

Robert J. McVittie, 42, assistant superintendent of the major alloys department at the Electro-Metallurgical Division of **Union Carbide & Carbon Corp.,** Niagara Falls, N. Y., died Dec. 1. He joined the company in 1930.

—o—

Floyd W. Parr, 62, superintendent of construction for **Canadian Bridge Co. Ltd.,** Walkerville, Ont., Canada, died Nov. 24 in a Detroit hospital. He had been associated with the company for 43 years.

—o—

James A. Miller, 75, a former president of **Pyrene Co. of Canada,** and founder of Accessories Manufacturers Ltd., died Dec. 8 in Montreal.

—o—

Charles E. Smith, 60, regional sales manager for Delco-Heat at **Delco Appliance Division,** General Motors Corp., at Rochester, N. Y., died Dec. 7.

—o—

John A. Regan, 61, formerly superintendent of transportation at the **Grasselli plant** of E. I. du Pont de Nemours & Co. Inc., in Linden, N. J., died Dec. 9.

—o—

Thomas E. Bond, former president of **Elgin, Joliet & Eastern Railroad,** died Dec. 9 at Chicago. He retired from this U. S. Steel Corp. subsidiary in 1946 after 38 years with the company and 47 years in railroading.

—o—

Frank N. Phillips, 75, president, **Washburn Wire Co.,** East Providence, R. I., and New York, died Dec. 9. He was vice president and treasurer of both Factory Mutual Liability Insurance Co. and the Automobile Mutual Insurance Co. of America.

—o—

Clarence A. Blum, 55, purchasing agent for **Inland Steel Products Co.,** at Milwaukee, died Dec. 6. He had been with the company about 30 years.

—o—

Lemuel N. Burhoe, 62, who retired last month as vice president of **Riverside Metal Co.,** Riverside, N. J., died Dec. 8.

—o—

John W. Van Atta, executive vice president and general manager of **Ralph B. Carter Pump Co.,** Hackensack, N. J., died Dec. 7.

—o—

Ralph D. Osborne, 66, president, **C. S. Osborne & Co.,** tool manufacturer at Harrison, N. J., died Dec. 11 in West Orange, N. J. He had been with the company since 1908 and its president since 1947.

—o—

Frederick W. Holcomb, 66, director of trade relations, **Scovill Mfg. Co.,** Waterbury, Conn., died Dec. 9.

—o—

William A. Harty, 69, president and general manager of **Exolon Co.,** Buffalo, died Dec. 7. He had been associated with the firm since 1922.

—o—

Chester W. Chapman, regional manager for the **Fargo Motor Corp.,** Philadelphia, fleet sales division of Chrysler Corp., died Dec. 8 at his home in suburban Ardmore.

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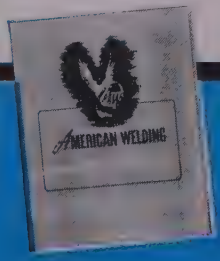

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Production and Engineering
NEWS AT A GLANCE

PERMANENT GALVANIZING KETTLE—Better zinc coatings are in store for the galvanizing industry. In New York, W. H. Spowers Jr., revealed the issuance of patents covering a permanent galvanizing kettle which will not only give a dross-free life, but may be operated at much higher temperatures than the present standard steel kettle to yield a zinc coat of fine quality. Development is expected to be offered to the industry as soon as satisfactory contacts are made.

FAST LIGHT METAL JOINING— A welding process which makes leak tight joints on metals ranging from 0.002 to 0.010-inch thick at a rate of 125 inches per minute is reported by Cook Electric Co., Chicago. Developed by the company's research lab for welding light-gage nonferrous metals in its Magnilastic and Diaphlex divisions, the process is now being adapted to production techniques in joining bellows diaphragms comprising a wide range of metals.

RECOVERS DIAMOND DUST— Diamond dust from carbide grinding sludge now may possibly be recovered economically and profitably by a method developed by Tungsten Process Co., New York. The company currently is operating a pilot line on the project. If successful, industries using diamond grinding wheels will be able to make significant savings by recovering the dust. At present diamond particles are being sent down sewers along with other grinding residue.

PRECISION PLUS—Machining plays an important part in turning out silicon bronze solderless electrical connectors in the plant of Jasper Blackburn Products Corp., St. Louis. Seventeen carefully-controlled screw machine operations are required to make these products. Full threads are used on both bolt and nut to assure maximum strength. Tests show that a joint made with one of these connectors provides better conductivity than a solid wire. In other words, resistance across the connection is less than that for a solid wire of the same length.

TRAVELING PAINT BOOTH— Car finishing is perfomed by a paint spray booth that "comes to the car" in the St. Charles plant of American Car & Foundry Co. Separate paint buildings and task of switching cars back and forth are a thing of the past. The fluorescent-lighted unit provides a tight, well ventilated work space for painters. Floor ducts for drawing out excess spray are so constructed that the booth can move along the side of a car during finishing operations.

PENETRATES MAGNETIC FIELDS— Perhaps greatest value of the electron-optical shadow research method, developed by National Bureau of Standards, Washington, lies in its utility for exploring complex electric and magnetic field of extremely small dimensions. In the past, calculations of the field intensity at a point were limited to those special cases in which the geometry of the field exhibits a high degree of symmetry. The shadow technique now provides data for accurate calculations of the absolute value of the intensity in the neighborhood of a specimen of any size or shape without disturbing this field. Method is said to be well adapted to investigating fundamental nature of ferromagnetism. Current studies are being made on the behavior of fringe fields of the ferromagnetic domains. An extension to ferroelectric materials also is contemplated.

ONE-TON BRASS BARS—Development and completion of its exclusive flat-metal continuous casting process and new brass rolling mill now enables Scovill Mfg. Co., Waterbury, Conn., to produce the heaviest cold-rolled and nonwelded brass coils within the industry. The continuous casting machine, which highlights the concern's $10 million facilities, is capable of casting rectangular-section brass bars weighing 1 ton each. In the company's unusual approach to brass rolling it capitalized on latest engineering methods, and former partly utilized practices. (p. 74)

NO HEAT LOSS—In processing piston castings at Briggs & Stratton Corp., Milwaukee, the work is cast two at a time. At breakoff, the gating returns to the furnace so quickly that much of its heat is retained preventing oxidation contamination and maintaining a high fidelity in analysis. From the breakoff, pistons are dropped into containers by a gravity conveyor, then moved quickly to heat treating department where they are normalized at 500° F for 12 hours. (p. 78)

PLASTIC ANISOTROPY — Critical examination of all available information on formability of sheet metals indicates clearly that material characteristics responsible for good drawing performance are not well understood. General belief that an isotropic material is more suitable for all types of sheet metal forming operations than an anisotropic material is refuted by a recent investigation. (p. 82)

FROZEN ORE—Movement of ore in the winter on the Great Lakes is restricted not because the lakes freeze over as some people believe, but because the ore itself freezes in railroad cars and cannot be handled. When ore does freeze in cars at the head of the lakes, railroads maintain steaming houses where a whole trainload of ore may be thawed. This is a long process and takes 8 to 12 hours during which many ships may pile up—a situation that is costly. Efforts now are being made to get rid of bothersome harbor ice and floating ice fields during the spring to lengthen the navigation season. (p. 88)

CONTINUOUS CASTING

Teamed with

COLD ROLLING

. . . affords improved product quality and economy of operation

Herein is described a new production line which organizes, in one straight flow, all the equipment necessary for producing cold-rolled brass, from flat-metal casting to packaging of the finished strip and sheet

HIGHLIGHTING the new continuous strip mill just completed at Scovill Mfg. Co., located in Waterbury, Conn., is a unique casting machine—the only such unit in this country—which continuously casts rectangular-section brass bars 24 by 2½ inches by 10 feet long and weighing over a ton each.

The Scovill management believes its new setup will remove most of the drudgery from rolling mill operations by the creation of a new mill atmosphere which affords more pleasant working conditions. With development and completion of its exclusive flat-metal continuous casting process and new brass rolling plant at a cost of over $10 million, Scovill is now able to produce the heaviest cold-rolled and nonwelded brass coils within the industry.

From 1943 to 1947 Stone & Webster Engineering Corp. engaged in a study of Scovill's strip rolling mill operations with a view to the development and construction of a brass strip mill that would be the last word in equipment and procedures and design. In February 1947 Stone & Webster was awarded the contract to purchase the equipment and construct the mill.

The latest engineering methods were utilized for efficient, straight flow production which resulted in a revolutionary approach to the rolling of brass; and application of practices, equipment and production layouts hitherto utilized in part but never before integrated into a single plant for the cold rolling of brass strip and sheets.

In addition to cartridge brass 70 per cent alloy, other continuously cast brass strip and sheet alloys produced by Scovill include gilding metal, 95 per cent; commercial bronze, 90 per cent; red brass, 85 per cent, and yellow brass, 65 per cent.

Operational sequence of the new continuous strip mill begins with the electric induction heating units followed by continuous casting, bar corner milling, two-high roughing, annealing, bar surface milling, four-high rundown, annealing, pickling and cleaning, four-high finishing, further annealing, pickling and cleaning, inspection, slitting and packaging. In addition, light gage material is run on another four-high rolling mill located in an adjacent portion of the plant.

Largest Induction Furnaces—Metal for casting is first melted in three Ajax-Scomet electric induction

Fig. 1—This unit continuously casts rectangular bars at the rate of millions of pounds weekly and assures clean, structurally sound metal through each bar length and produces lengths hitherto impossible by any other method

Fig. 2—Three such furnaces are used to melt brass in preparation for the continuous casting operation

elting furnaces of 1000 kw each having a capacity 10,000 pounds per hour. Being the largest used the brass industry, they are equipped for precision ntrol of melting temperatures and other factors hich greatly influence metallurgical qualities of the nished brass. Furnace efficiency, according to pres- nt operating experience, is higher than that obtained ith any other type due to the fact that a high mount of power is concentrated within a small space. Ietal holding capacity of the units has been reduced s much as possible in order to facilitate rapid change of alloys, a requirement of no little importance in a brass mill. Power supply is 575 v, 60 cycles, 3-phase, with all phases balanced. Holding capacity is 22,000 pounds maximum.

Molten metal removed from the furnaces is then transferred in 2½-ton ladles to the Junghans-Rossi continuous casting machine. A holding furnace mounted over the casting machine provides a continuous flow of molten brass into the unit. An inter-

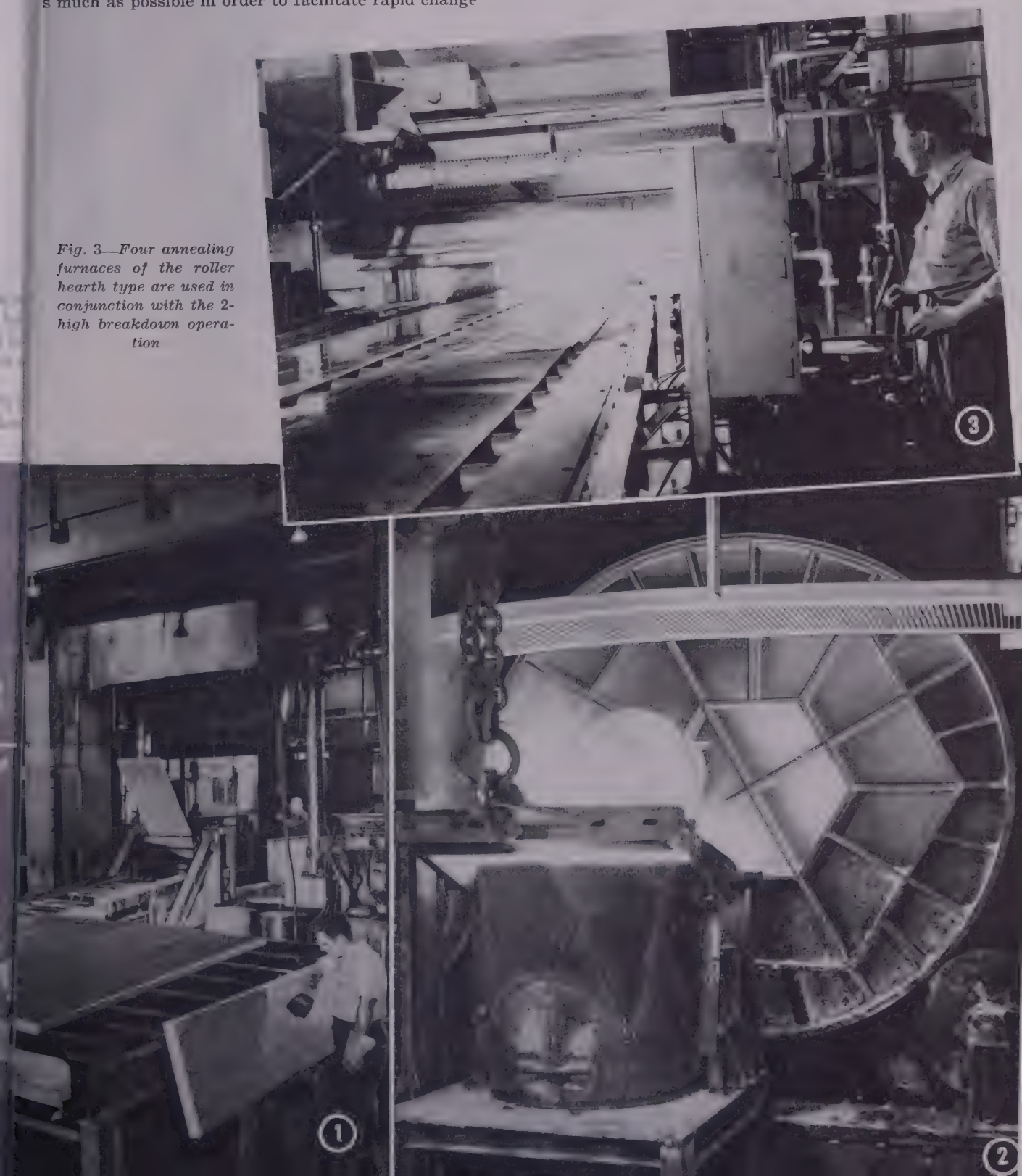
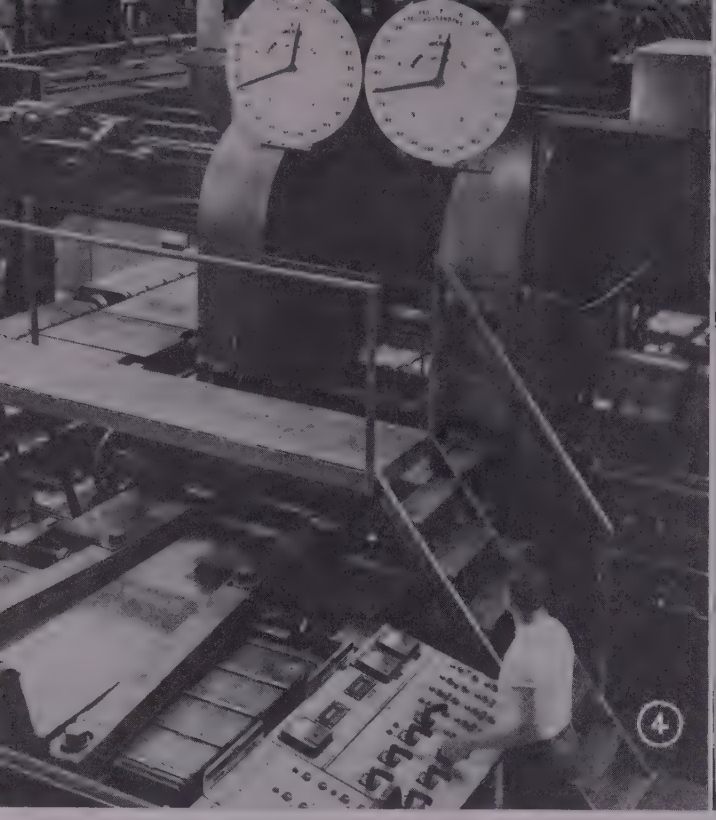


Fig. 3—Four annealing furnaces of the roller hearth type are used in conjunction with the 2-high breakdown operation



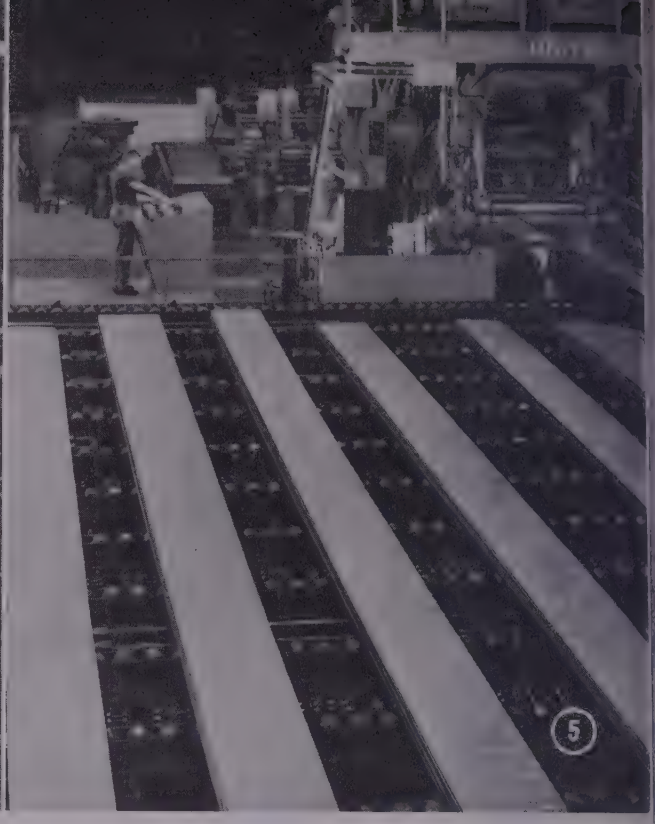


Fig. 4—In this 2-high breakdown mill, largest ever built for the nonferrous industry, preliminary rolling operations are handled

Fig. 5—Entry side of 4-high rundown mill whose tremendous strength and power effects a reduction-pattern most beneficial to the internal structure and workability of the finished strip

mixing of charges from the three furnaces give additional uniformity of composition to the casting as the metal descends through the water-cooled mold. The holding unit has a bath capacity of 9000 pounds and utilizes a 120 kw Ajax induction unit for maintenance of the metal at desired pouring temperature. The furnace is equipped with two diametrically opposite sets of spouts, each set consisting of a pouring down spout, a receiving funnel, and an emergency dump spout.

Needle Valve Controls Pouring—When the machine is running, the furnace is tipped 25 degrees and the front down spout is submerged in liquid metal in the mold. When not running, both down spouts stick out of the horizontal furnace at 25 degrees vertical and above the liquid metal lying in the furnace. Pouring rate of molten metal through the down spout is controlled by a needle valve through the top of the holding furnace. A water-cooled copper mold reciprocates up and down—the downstroke being synchronized with the discharge rate of the bar; the upper stroke returns at three times that rate. A constant gas flame at the top of the mold prevents oxidation of the surface of the pool of molten metal.

The brass descends at a constant speed through the mold and as it emerges is automatically sawed into bars of uniform length, each one weighing in excess of 2000 pounds. The conventional operation of shearing or sawing gates from individually cast bars has thus been eliminated, and internally sound metal is assured throughout the entire length, width and thickness of the bar. Material is then inspected, tested and sent to the continuous strip mill for subsequent cold rolling.

Machinery regulators and materials handling equipment give new concepts of efficiency. Pushbutton control characterizes the heavy equipment, and automaticity is introduced wherever possible. In the cold rolling mills spacing between working rolls is kept constantly uniform by photoelectric controls which compensate for varying temperatures and roll expansion which takes place as rolling progresses. The result is exceptional uniformity of gage. Vacuum cups and roller conveyor handling equipment eliminate much laborious manual handling usually associated with brass mill work, and are big factors in the virtual elimination of dents, pits, gouges and scratches in the finished metal.

Annealing and cleaning equipment incorporate the most modern devices for producing closely controlled annealed tempers and clean, smooth surfaces. The final annealing furnace and cleaning unit are coupled so that as the strip or sheet emerges from the furnace it is automatically positioned and travels at a controlled speed through the cleaning unit.

Heaviest Cast Coils Produced—Chief advantages afforded Scovill through operation of this new continuous casting unit integrated with modern cold rolling equipment are: Ability to produce the heaviest continuous-cast coils in the brass industry, with no welds to pull apart and no imperfect joints to damage dies or tools; uniformity of chemical composition, temper and gage from strip to strip and sheet to sheet; annealed and cold-rolled tempers and grain size more closely controlled than ever before, resulting in brass that fills the most exacting fabricator

pecifications; edges of strip and sheet having less amber; crown being practically eliminated and minimum tolerances achieved in thickness, width, length and edgewise straightness.

Bars after emerging from the continuous casting unit are milled at all four corners to eliminate the possibility of any fishtails appearing during subsequent cold rolling. Prior to going through the four-high rundown mill the stock is given a surface milling on both sides to remove any remaining roughness.

First rolling unit, a 2-high 30 x 36-inch breakdown mill together with its unique handling equipment was designed and built by Farrel-Birmingham Co. Completely mechanized handling makes it possible for two operators to manipulate the bar on both sides of the mill and also regulate roll speeds and gage, all from two control desks, one placed on each side of the mill on opposite sides of the roller tables. The system employs the use of vacuum pilers and unpilers traveling over the entry, delivery and transfer tables. The flat metal vacuum handling equipment was produced by Wean Engineering Co. These units each consist of a series of suction disks mounted on a structural supporting member.

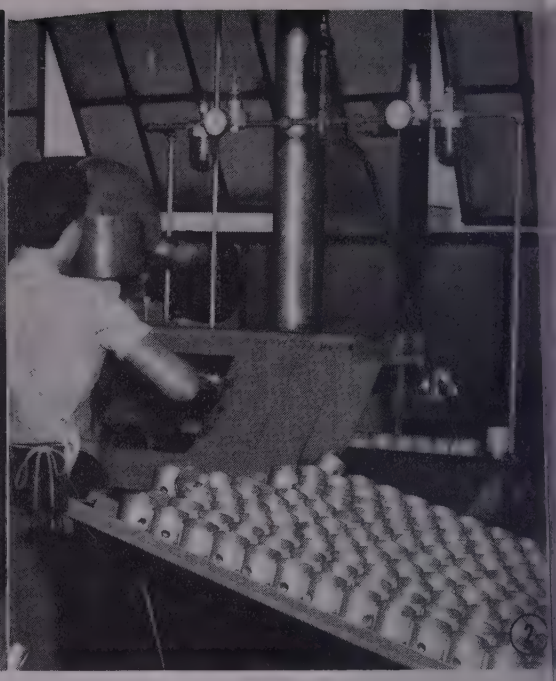
On the feed side, the routine processing procedure is to lift the bars from the transfer table to the entry table of the mill where a hydraulic sticker is installed to assure positive entry of each bar into the roll bite. On the delivery side, a kick-off device removes the bar after the pass to one of the transfer tables located on either side of the delivery table. Eight kicker arms are set on different centers to accommodate varying lengths of bars. From either of the transfer tables on the delivery side of the mill, the bars are stacked by vacuum pilers and the stacks later returned by chain transfer to the entry side of the mill for a succeeding pass, or delivery made to the annealing oven.

Fig. 6—View of vacuum cup handling equipment operating in conjunction with the 2-high mill. This system is used to transfer individual bars to the mill entry table where they are entered in the rolls by a hydraulic pusher or the power feed entry table

Rolls Hydraulically Counterbalanced—Double motor screwdown of the mill is equipped with magnetic clutches which provide for the independent operation of either screw or the simultaneous adjustment of both. The mill utilizes forged steel rolls, the journals of which are supported in precision sleeve bearings. The top roll is hydraulically counterbalanced by means of cylinders located on the under side of the mill housings, which support the roll against the adjusting screws through lifter rods.

Universal spindles are used to connect the rolls to the pinion stand and these units are simply but effectively designed to eliminate shock, looseness and end thrust. Both the controls and motors for the 2-high breakdown mill were furnished by General Electric Co. The main drive consists of a rugged mill-type wound-rotor induction motor capable of delivering 2000 hp continuously at either 360 or 720 rpm. The mill auxiliaries—screw down, table and transfer drives—are all equipped with dc mill-type motors: Five 10 hp, one 25 hp and three 35 hp. GE also furnished motors for the vacuum cup slab pilers and unpilers, pickling lines and medium duty slitting line.

Three continuous gas annealing furnaces designed and built by Surface Combustion Corp., are of the direct-fired roller hearth type. Burning propane gas they are designed for production capacities of about 32,500 pounds per hour of coiled sheet to 36,700 pounds per hour of in- (*Please turn to Page* 106)



ROUGH CASTINGS to FINISHED

• • • *in less than 3 minutes*

Through efficient die casting and swift flow machining methods, Briggs & Stratton produces aluminum pistons for gasoline engines in record time

By GERALD ELDRIDGE STEDMAN

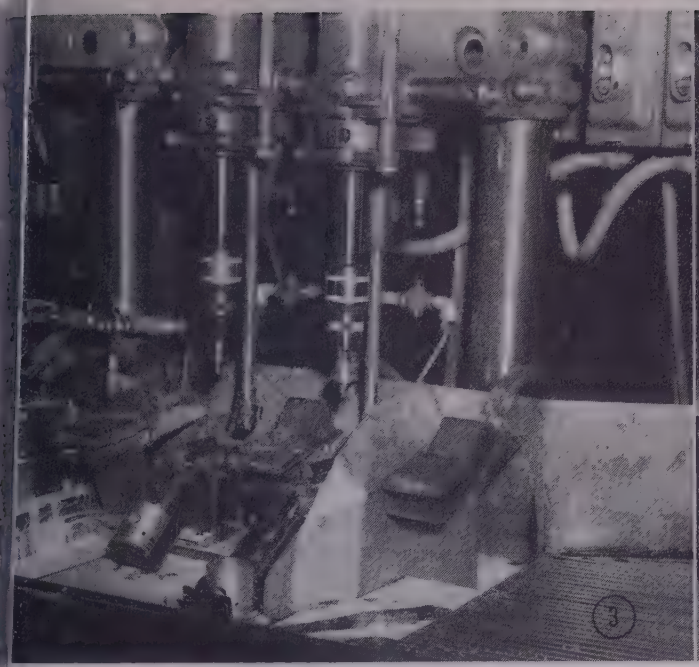
DIE CAST aluminum pistons for air-cooled gasoline engines are transformed from rough castings to finished products in less than 3 minutes at one of Briggs & Stratton Corp.'s Milwaukee plants. Flow of work through the machining sequences involves two lines, each equipped with a series of four machines. Three girl operators handle each line to gain 2000 pistons every 8 hours. A total working force of eight, including six operators, an inspector and a setup man produces 4000 pistons per 8-hour shift.

The layout is characterized by a portable machine and swivel setup with turntable material handling which provides a highly flexible double-up arrangement for high speed production. Machining area, together with inspection and storage, occupies only 1200 sq ft.

With the exception of crankshaft, springs, cylinders and rings, the four-cycle engine is practically all die cast. It is produced in six models with a range from 0.8 hp to 8.25 hp, from 2200 rpm to 3600 rpm, with bore and stroke from 2 x 1½ inches to 3 x 3¼ inches and net weight from 30 to 101 pounds. These engines are characterized by four cycle design, air cooling, sure-fire ignition, efficient carburetion, adjustable governor, positive lubrication and precision-made parts.

All pistons for the engine line are aluminum, produced in four sizes of 2, 2¼, 2⅝ and 3 inches. One piston machining line is devoted entirely to 2-inch pistons, and the second line produces all other sizes. Because of the unique swivelling arrangement of the layout these lines can also be doubled up to produce 2-inch pistons on both lines. Aluminum used in piston production is known as No. 7 alloy, and analyzes: Fe 0.7 per cent; Cu 2 to 3 per cent; Si 5 to 7½ per cent; Mn 0.5 per cent; Sn 0.3 per cent; Zn 1 per cent; Mg 0.1 per cent; remainder aluminum.

Casting Practice—Practice here is to cast two pistons at a time, using the Lester-Phoenix casting machine at a casting temperature of from 1180 to 1220°. The casting machine has a 28 x 30-inch die platen with die opening of 10¼ inches. Locking pressure is 600 tons. The maximum casting area with 1¾-inch diameter plunger is 40 square inches. Maximum plunger pressure with the 1¾-inch plunger is 22,000 pounds. Break-off press is maintained by casting machine side where pistons are broken off and



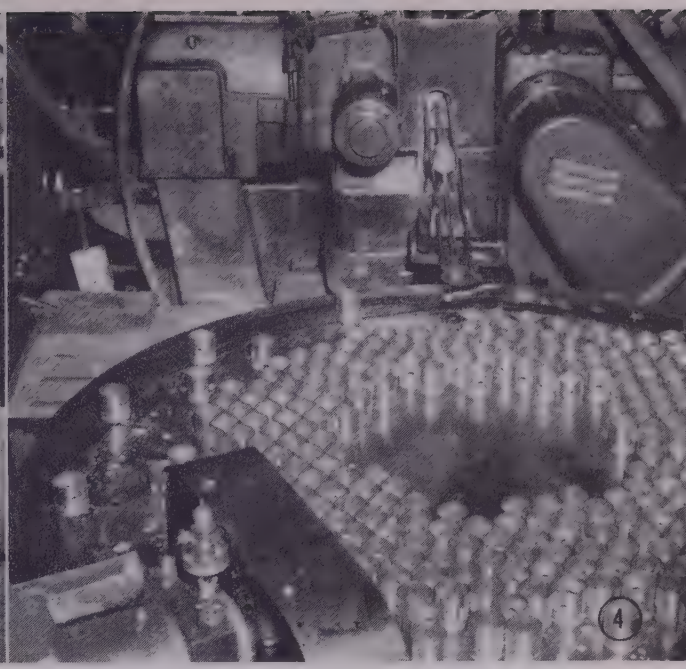


Fig. 1—Two aluminum pistons at a time are cast in this Lester-Phoenix casting machine with 600 tons locking pressure and 1¾-inch plunger pressure of 22,000 pounds

Fig. 2—Two-line piston machining sequence is fronted by two specially developed J & L 8-inch Faye lathes, portably swiveled at 90-degree angle position to serve either line. They are automatically solenoid controlled to perform seven sequential steps in one operation at production rate of 250 pieces per hour. Work slides by gravity to drilling setup

Fig. 3—Three-spindle drill setup rough reams, cuts retainer grooves and finish reams piston holes in a three-step sequence by one operator. Notice unique gravity unloading feature that positions work for rapid, accurate operator handling

Fig. 4—After centerless grind, pistons come by gravity slide to turntable with automatic positioning of piece flow and removal, providing a highly flexible, high production material handling facility. Work from here proceeds to diamond boring

ISTON

the gates are returned to furnace for remelt by conveyor handling.

In the 60 x 140 foot casting department, with a labor force of 55 molders, pot men, inspectors, repairmen and truckers, the 1948 production was 48 million castings, including many very precise castings of lock cylinders as well as a great variety of engine parts. Eighteen casting machines are maintained. There are three 2800-pound zinc alloy furnaces, one zinc remelt furnace, two aluminum furnaces of 3000 pound capacity.

Flexible Molds—Piston molds for this casting are flexible to accommodate all sizes. Cast two at a time, the gating at break-off returns to furnace so quickly as to have much of its heat, thus preventing any oxidation contamination and maintaining a high fidelity in analysis. Pistons come off break-off by gravity into containers which are moved to heat treat department for normalizing at 500° for 12 hours in batch type furnaces, and then work flows to this unique machining department setup. Rough cast pistons are placed in a hopper containing 2000 pieces, or daily production for one line.

Machining Sequence—First machining sequence is accomplished on a J & L 8-inch Faye lathe, specially developed to Briggs & Stratton engineering department ideas for this job. It is an automatic solenoid controlled machine tool which accomplishes seven sequential steps in one operation at a production rate of 250 pieces per hour. Its sequential machining steps are to turn outside diameter, chamfer skirt, rough and finish groove, turn lands, chamfer oil and ring groove. Carboloy cutter tips are used and there is also some negative rake involved.

Work then moves to a Delta 17-inch three-spindle drill press which rough reams the wrist pin hole and cuts the retainer grooves on both sides of the piston, and finish reams. After washing, the pistons are given a finish centerless grind in one machine operation, two Cincinnati grinders being used.

Then the work receives a diamond bore of wrist pin holes in Stoker units, using Simplex boring machine No. 1. A unique turntable is used from the centerless grinder to the diamond boring operation which is featured by automatic loading, gravity slide to the turntable, automatic positioning of the piece flow and removal from the flow. Machines involved in this sequence are designed for 90-degree portability, making them available to both lines, and, in effect, creating highly flexible production facility.

After the diamond boring (*Please turn to Page* 98)

WELDABLI

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STAINLESS clad material has been widely accepted in industry and transportation and is a rapidly growing field of metallurgical endeavor. Several well-known companies are making this product, using mild steel as the "core" material.

The properties of copper, also a core material, are well-known. Processing of food is gradually coming to the point where the industry considers contact of copper with edibles undesirable. There is no solid commercial material, however, which will meet the requirements of noncontamination, discoloration, or taste distortion, and at the same time give the heat conductivity and uniformity of temperature that copper affords.

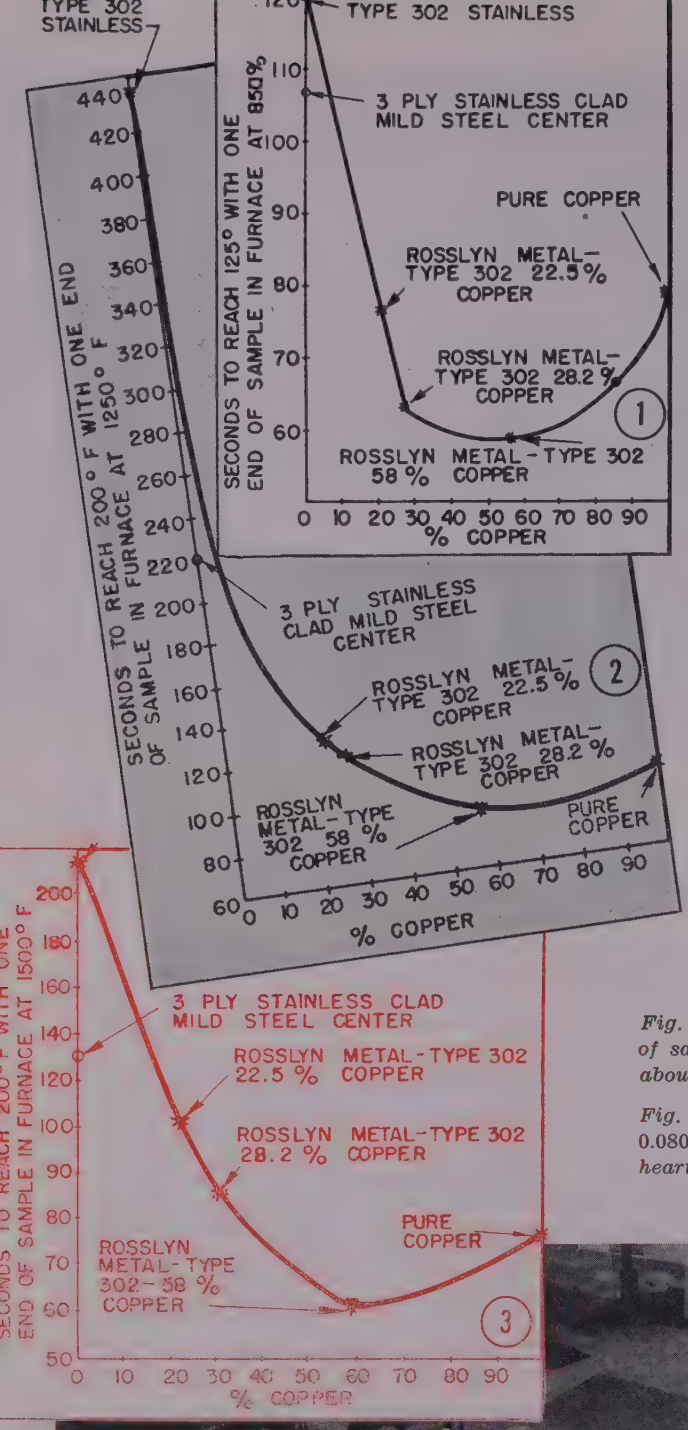
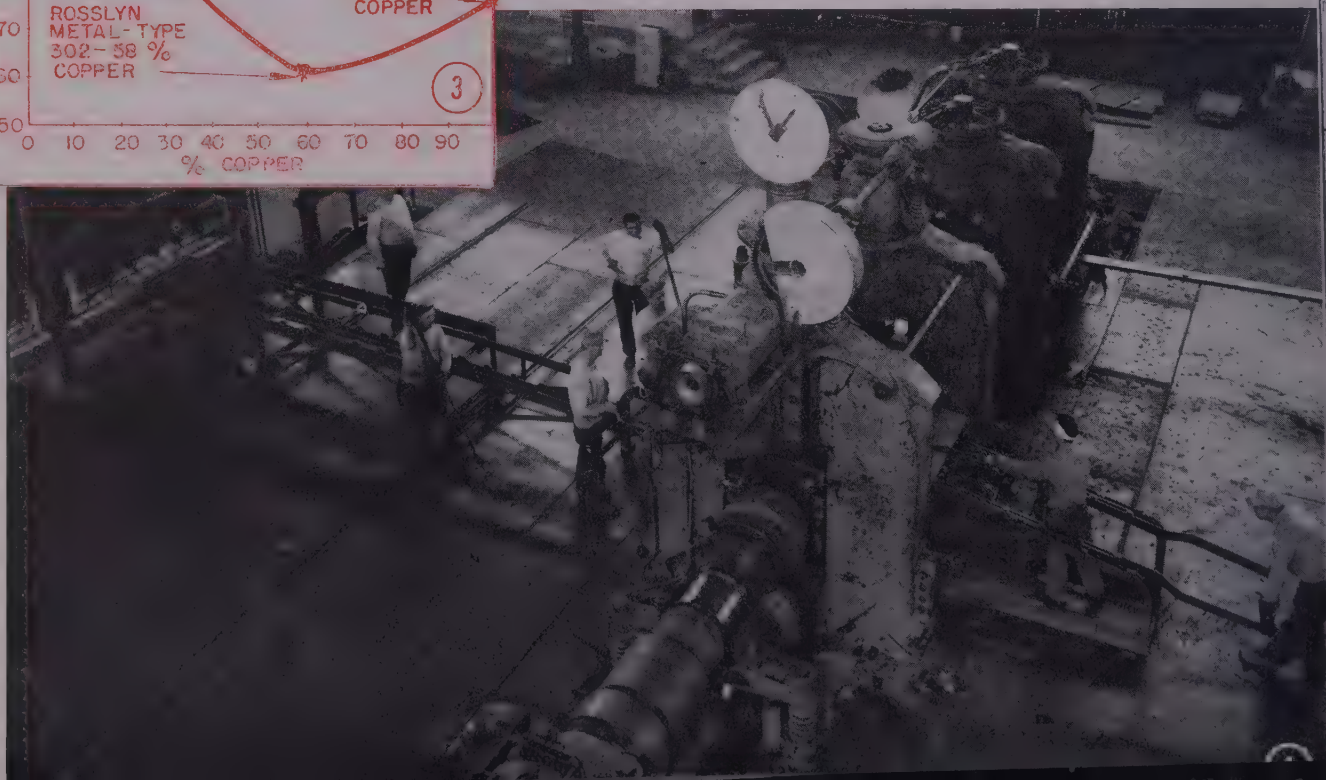

TYPE 302 STAINLESS
3 PLY STAINLESS CLAD MILD STEEL CENTER
PURE COPPER
ROSSLYN METAL-TYPE 302 22.5% COPPER
ROSSLYN METAL-TYPE 302 28.2% COPPER
ROSSLYN METAL-TYPE 302 58% COPPER
SECONDS TO REACH 125° WITH ONE END OF SAMPLE IN FURNACE AT 850°F
% COPPER
1
SECONDS TO REACH 200° F WITH ONE END OF SAMPLE IN FURNACE AT 1250° F
2
3

Fig. 1—Lateral conductivity tests of copper-austenitic stainless clad metal, 850-125° F. About 11½-inches of sample in furnace hearth at 850° F. 125° F measuring point about 4 inches from furnace hearth. Samples about 0.080 x 2 x 26¼-inches

Fig. 2—Lateral conductivity tests, 1250-200° F. About 11½-inches of sample in furnace hearth at 1250° F. 200° F measuring point about 4 inches from hearth. Samples about 0.080 x 2 x 26¼-inches

Fig. 3—Lateral conductivity tests, 1500-200° F. Samples about 0.080 x 2 x 26¼-inches. About 11½-inches of sample in furnace hearth at 1500° F. 200° F measuring point about 4 inches from furnace hearth



TAINLESS-CLAD COPPER

. . . Offers Material Economies in Many Applications

Combining the heat conducting properties of copper with corrosion resistance and other qualities of stainless steel, a new composite material has wide use in food and chemical processing, refrigeration, utensil, appliance and aviation industries

The natural step, therefore, was to try to supply aterial in composite form which would combine all .e good qualities of copper and at the same time ve the beauty, ease of cleaning, nondiscoloration id nondistortion of taste afforded by one of the ainless alloys.

When considering stainless steel and copper sepaately as to their melting points, yield points, stress rain curves, and various other well-known data, is apparent that the combination of two such etals in a composite form would be very difficult not impossible. This same supposition earlier as made when considering the combination of mild teel and stainless steel. American Cladmetals Co. as organized when a lamellar composite material ith a copper center was metallurgically bonded to amellar of stainless steel on either side.

Variety of Applications—Interest in this so-called Rosslyn metal expressed by the aviation industry, tationary power plant industry, food and chemical rocessing industry, refrigeration industry, and the tensil and appliance industry will not be surprising hen the charts illustrated in Figs. 1, 2 and 3 are tudied. Tests were made by C. T. Evans Jr., chief metallurgist of Elliott Co., Jeannette, Pa., in collaboration with American Cladmetals' engineers. Test setup is shown in the diagram, Fig. 6.

These charts show that the laminated material actually has higher lateral conductivity than pure copper under some conditions typical of service installations. This is not too surprising when it is considered that heat transfer is usually not simply a matter of thermal conductivity.

In the tests illustrated, a constant amount of heat was available to each sample. A given temperature in the furnace was no doubt reached more quickly by the pure copper than by any of the other metals tested because of the high conductivity. However, the measuring point was not in the furnace, but approximately 4 inches from the furnace hearth, so that radiation and emissivity effects of the material outside the furnace were also important. These meant higher heat losses for the copper, whereas in the case of the composite metal, the stainless acted as "insulation," sealing in the heat as it travelled out through the composite piece.

Simulate Conditions—It appears from field results reported that these tests accurately simulate the condition existing in domestic and industrial cooking utensils, where the bottom is soaking up heat from a relatively constant source, and it is desired to distribute that heat as quickly and evenly as possible to the other sections of the utensil. The 850° F 125° F tests, Fig. 1, are particularly illustrative of the cooking utensil problem.

The 1250° F 200° F tests, Fig. 2, and the 1500° F 200° F tests, Fig. 3, are more applicable to the heat transfer requirements of combustion chamber liners for jet engines. Even at these higher temperatures, the composite material compares favorably with pure copper which would, of course, oxidize to destruction if exposed to such heat over any extended period of time.

(*Please turn to Page* 104)

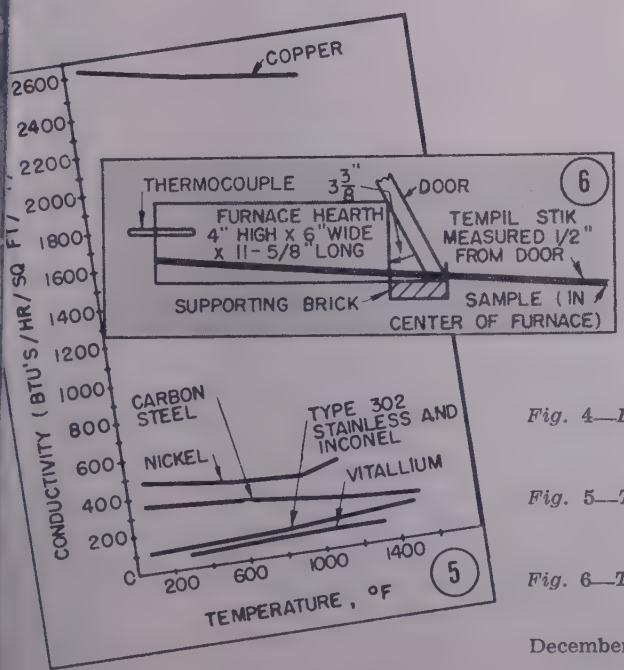
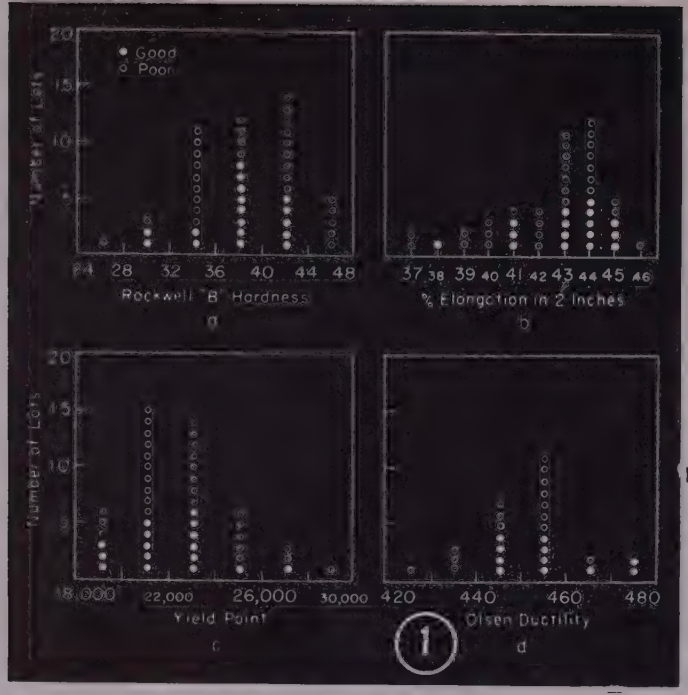


Fig. 4—Equipment for rolling combination austenitic stainless and copper in clad form

Fig. 5—Thermal conductivity as it varies with temperature for a number of base materials

Fig. 6—Test setup, showing location of sample in furnace

BETTE



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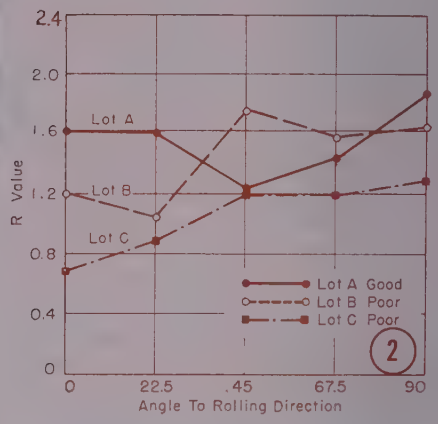
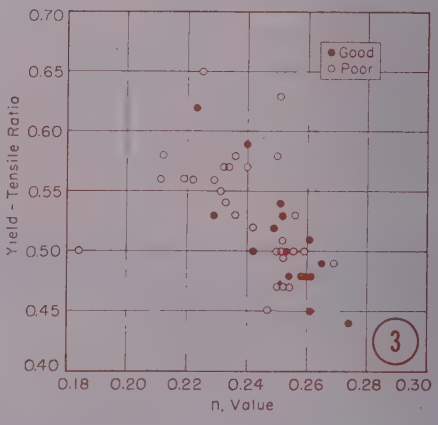




GENERAL belief that an isotropic material is more suitable for all types of sheet metal forming operations than an anisotropic material is refuted by an investigation reported here. Although it is still believed that an isotropic material is best suited for symmetrical formations, for certain unsymmetrical formations material having a considerable degree of plastic anisotropy of a favorable nature results in the best press performance.

It is possible to discriminate successfully between materials having similar ordinary mechanical properties but which exhibit wide differences in press performance in unsymmetrical draws. This is done by considering favorable plastic anisotropy, as measured by the ratio of width strain to thickness strain in a simple tension test, together with a favorable strain hardening index, as determined from the true stress-strain curve in simple tension, as requisites for good press performance. A good correlation is found between plastic anisotropy and magnetic anisotropy, indicating that the plastic anisotropy arises from preferred crystallographic orientations.

These new findings suggest that for optimum press performance the plastic anisotropy characteristics of the material must be suited to the symmetry of the forming operation.

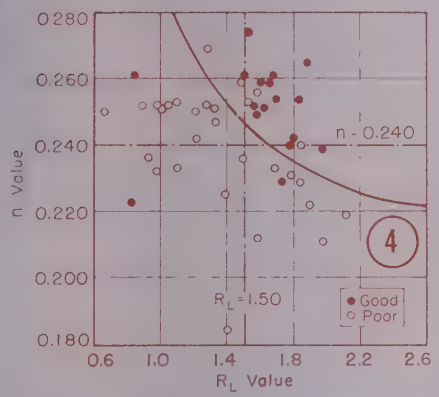
A critical examination of all available information on the formability of sheet metals clearly indicates that the material characteristics responsible for good drawing performance are not well understood. Furthermore, it can be inferred from occasional observations of unexplainably high breakage in severe sheet metal forming operations that conventional testing methods are failing to reflect important aspects of the material behavior which are operative under actual forming conditions. This situation is of particular concern in connection with very severe forming operations, such as automobile fender draws, in which such great demands are placed on the material that very subtle differences can result in wide variations in press performance.

Better Understanding Needed—Because of the great need for a better understanding of the basic properties which are essential for optimum press performance in deep drawing sheets, a comprehensive, long

For optimum press results plastic anisotropy characteristics of the deep drawing material must be suited to the symmetry of the forming operation

RESS PERFORMANCE

. . . expected in asymmetrical deep drawing operations



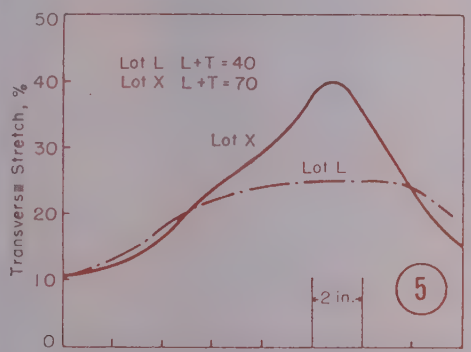


Fig. 1—Distribution of (a) Rockwell B hardness, (b) per cent elongation in 2 inches, (c) yield point values for all lots, (d) distribution of Olsen ductility values for 26 lots

Fig. 2—Variations of "R" value with direction of testing for lots exhibiting good and poor press performance in formation A

Fig. 3—Relationship between yield-tensile ratio and "n" value

Fig. 4—"n" value vs "R_L" value for all lots tested

Fig. 5—Distribution of strains in fenders (formation C) from trial lots L and X

range program of research in this field was inaugurated by Carnegie-Illinois Steel Corp. about 4 years ago. In this program it was planned to conduct studies of all aspects of the plastic flow and ductility characteristics believed to be of importance in sheet metal formability. It was expected that the information developed in such a research program would not only indicate the most fruitful directions for improvements in deep drawing sheets, but would also provide a basis for the development of more discriminating practical tests for the evaluation of deep drawing quality.

Materials studied in this investigation include samples from 46 lots of fully aluminum killed, low carbon deep drawing sheets which exhibited wide variations in drawing performance in the plants of several producers of deep drawn parts. All of the material was in the cold reduced, box annealed, temper rolled condition. Twenty-nine of the lots exhibited high die scrap, whereas seventeen lots were representative of good performance. Materials of good and poor performance in four different fender draws are represented, each of these formations involving severe biaxial stretching of an unsymmetrical nature.

Two of the poor lots were experimental materials purposely processed in such a way as to produce a more isotropic material than that known to give best drawing performance in the formations studied. These lots were produced in order that additional information could be obtained on the effects of plastic anisotropy on the strain distributions in unsymmetrical draws.

Experimental Methods—True stress-strain curves were determined by a precision technique. Since magnetic anisotropy as indicated in the magnetic torque test is known to reflect preferred orientations, magnetic torque curves were obtained for all the materials in this investigation. These curves were determined on a new recording type of torque magnetometer developed at the United States Steel Corp. research laboratory.

From data presented by the authors at the 1949 metal congress, ASM, Cleveland, Oct. 17-21.

In this instrument, the torque exerted on a 1-inch diameter sample disk is converted by a resistance strain gage to a small direct current voltage which in turn is applied to the measuring circuit of a voltage recorder of the proper sensitivity. The sample disk is rotated about an axis perpendicular to its plane by a synchronous motor driving through reduction gearing. The chart paper in the recorder also is driven by a synchronous motor, so that there is a definite relation between the angular rotation of the disk and the linear movement of the chart paper.

As the disk is rotated, the torque varies and the pen in the recorder moves in accordance with this variation. By use of the proper conversion factor, the voltage recorded on the chart paper becomes a plot of torque versus angular displacement of the disk in the magnetic field, using the rolling direction as the reference. The resulting curve is dependent upon the preferred orientations present in the specimen.

Mechanical Properties—The ordinary mechanical properties were determined by conventional techniques. "Yield points" were determined either by the dividers method or from the proportional limit on a recorded stress-strain curve using a strain magnification of four. Since the steels tested did not exhibit a sharp yield point, the "yield point" values reported actually represent an offset yield strength, the offset corresponding very closely to 0.2 per cent.

As indicated previously, it has been generally believed that material substantially free from directionality in plastic properties would result in the best press performance in any type of sheet metal forming operation. Apparently this belief had its origin in difficulties experienced in the formation of symmetrical shapes, such as cylindrical cups, where it was well known that pronounced plastic anisotropy produces "earing" and frequently leads to breakage. Since it has come to be recognized so widely that these difficulties in symmetrical types of forming operations can be eliminated through the use of material processed so as to have a minimum of anisotropy, the assumption was made apparently rather generally that such materials would likewise be best suited for other types of forming operations. Numerous statements to this effect have been made in the literature.

Ideas Modified—As the present investigation proceeded, it became evident that the prevalent ideas regarding the desirability of using isotropic material in all types of deep drawing operations should be modified. Although it is still believed that a isotropic material is best suited fo symmetrical forming operations, i has been demonstrated that materia having a considerable degree of plas tic anisotropy of a favorable natur results in the best press performanc in the particular unsymmetrical for mations studied in this investigation

On the other hand, it has bee shown that material having a mini mum of plastic anisotropy results i very poor press performance in thes same unsymmetrical formations. Th superior performance of the aniso tropic material in these formation is believed to be a consequence of a more favorable distribution of strai than that obtained with isotropic ma terial in the same formation. Th evidence obtained in the strain dis tribution studies on fenders formed from two of the lots of materia tested supports this hypothesis.

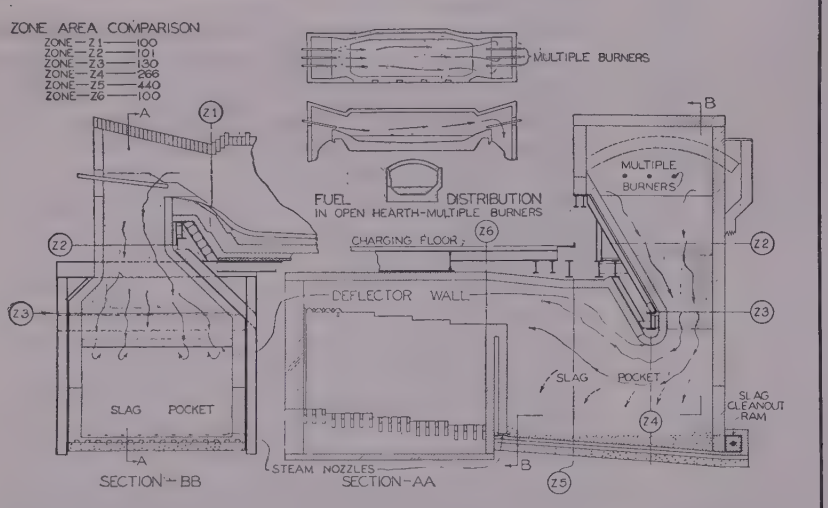
In this experiment, it was shown that fenders formed from a nearly isotropic material exhibited a very severe localization of strain, whereas fenders formed from the markedly anisotropic material represented by the second lot exhibited a more widespread distribution of strain and consequently much lower maximum total strains. This difference in maximum strain was, of course, reflected in the higher breakage observed for the nearly isotropic material.

It should be emphasized that the nearly isotropic material was purposely processed in such a way as to be ideally suited for a symmetrical draw, i.e., so as to have a minimum of anisotropy. This lot is thus representative of the type of material which is widely used to obtain best results in symmetrical forming operations.

On the basis of this evidence, it appears that the material requirements for best drawing performance for all types of formations must be re-evaluated. In particular, information developed in this investigation strongly indicates that the performance in many deep drawing operations can be improved by suiting the plastic anisotropy of the material to the symmetry of the formation.

Conclusions — Sheet steels having excellent press performance in difficult unsymmetrical fender draws exhibit marked plastic anisotropy as measured by the ratio of width strain to thickness strain ("R" value) in the simple tension test. This plastic anisotropy is associated with preferred crystallographic orientations by correlating "R" values with magnetic torque characteristics, the latter being known to reflect preferred orientations.

A large number of examples of



IMPROVED DESIGN: Suspended refractory deflector for removal of heavy solids from combustion, multiple burners for greater efficiency, large self-sealing charging doors, cross-vent basket weave and locked checker brick with smaller openings and larger heating surface are features of an improved open-hearth furnace design of Jay J. Seaver Engineers, Chicago. Deflector makes combustion products make a 180 degree turn, causing them to be thrown into slag pockets by centrifugal force and gravity, thereby eliminating checker chamber deposit and lancing. Multiple burners are said to provide greater fuel air contact surface and provide greater flexibility of control, plus promoting faster heat transfer to the bath

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apparently anomalous drawing performance in severe fender draws can be explained on the basis of unfavorable plastic anisotropy, thus demonstrating the importance of favorable anisotropy as a factor in good press performance in this type of draw. A quality index based on a combined requirement of favorable plastic anisotropy ("R_L" value) and favorable strain hardening exponent ("n" value) gives a high degree of correlation with drawing performance in tests of 46 lots having wide differences in press performance but exhibiting similar ordinary mechanical properties.

The yield-tensile ratio can be used as an alternate to the "n" value as a measure of strain hardening. However, somewhat poorer correlation with drawing performance is obtained when the yield-tensile ratio and the "R_L" value are considered in combination than when the "n" value and "R_L" value are considered in combination.

Material processed in such a way as to minimize anisotropy, so as to give good performance in a symmetrical draw, is shown to result in high die scrap in an unsymmetrical fender draw. It appears that the prevalent belief that a randomly oriented, isotropic sheet is best for any type of forming operation, other things being equal, should be abandoned in favor of the concept that the plastic anisotropy characteristics of the material must be suited to the symmetry of the forming operation.

11-Station Machine Is Automatic

GREATER efficiency in processing large aluminum crankshafts is said to be achieved with a special-purpose 11-station, line index, 90 degree V-type hydraulic feed machine built by Snyder Tool & Engineering Co. of Detroit. Entirely automatic after loading, it has guide plates to establish accurate positioning. Clamping is manual and a hydraulic shot bolt is provided to position the index slide before the heads start operations.

Machine itself consists of a welded steel bed with hardened and ground steel ways, upon which is mounted the hydraulic index slide. Welded steel columns on each side of the bed carry two counterweighted Snyder standard units, each unit having a 14-spindle head. In addition, th columns carry two tapping units wit two 14-spindle individual lead scre tapping heads. The part is automa tically moved through the eleven in dexes required.

High speed steel tools which ar hydraulically fed into the work dril counterbore and tap a total of 16 cylinder stud holes. Power is fur nished by three 7½ hp motors op erating at 1200 rpm, two 7½ h motors operating at 1800 rpm an two 5 hp motors operating at 180 rpm. Time cycle of the electricall interlocked machine is 2 minutes, 1 seconds, without loading or unloadin time.

Role of Industrial Photography

IN MOTION picture form, Eastma Kodak Co., Rochester, N. Y., is de scribing the role of modern photo graphy in industry. This new film entitled "Functional Photography i Industry," is actually a survey or film of the ways which photography today is serving industry in research production, quality control, advertis ing and sales.

INFRARED OVEN

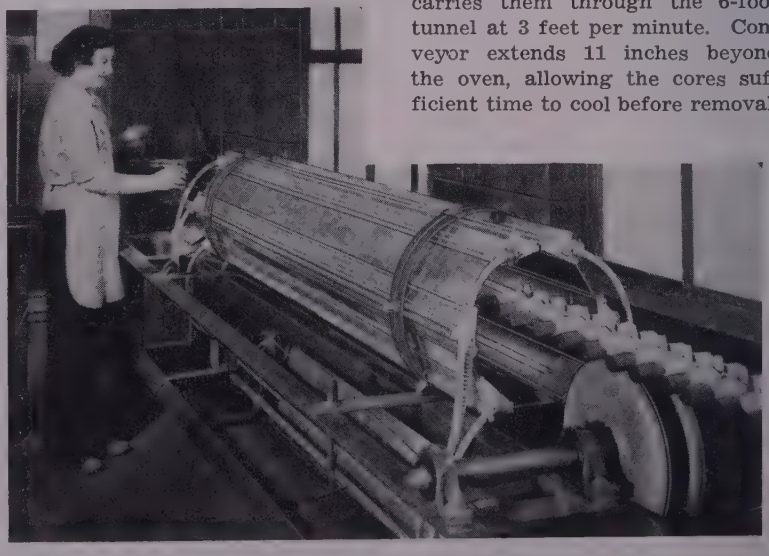
Triples Core-Drying Capacity

RADIANT infrared heaters are the heating media by which a full day's production capacity of wash-dipped sand cores is being turned out in 3 hours in a Milwaukee plant. Installed in an oven, the all-metal Chromalox heaters are mounted at angles to form a circular drying tunnel, temperature of which is regulated by a variable input controller.

At the Milwaukee Flush Valve Co., baked cores for a variety of brass plumbing fixtures are dipped in a wash solution to provide a smoother finished surface and to coat exposed core wires which were formerly hand-brushed. Breakage is minimized as cores are dry in about 2 minutes after dipping. The previous method of batch-drying proved costly due to crumbling of soaked cores prior to drying. Burning or under-baking of the cores is prevented by the accurate temperature control. Entire oven unit may be turned off when not actually in use, as it may be brought up to operating temperature in 2 minutes.

Efficiency Increased—As for the design of the oven, the two top heaters are hinged together with standard tongue-and-groove joint and the remaining four are spaced evenly around the conveyor. Radiation is intensified and efficiency increased by polished aluminum reflector sheets between the heaters. Two circular steel bands, to which the heaters are fastened by sliding stud bolts, form the shape of the oven.

Cores are dipped in a wash then set on a wire conveyor which carries them through the 6-foot tunnel at 3 feet per minute. Conveyor extends 11 inches beyond the oven, allowing the cores sufficient time to cool before removal.



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Experience does it every time. With it, you get the best in production-tooling, the best in precision, finish, speed, economy. Cases in point are these three dissimilar jobs, varying widely in size and specifications:

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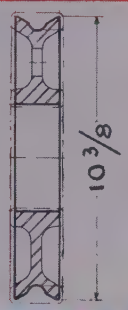
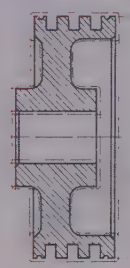
3. A cast iron Piston

All three of these pieces are machined to the limits and class of finish specified, *on ONE machine — the 5 DE Automatic — with ONE combination set of tools designed by the ingenuity of P&J specialists backed by fifty years' experience in this special kind of tool engineering.*

Perhaps *your* varied parts production can be put on a similarly profitable basis. It pays to check with P&J – you stand to gain in production, in fewer rejects, in economy, in divided labor costs. Simply send your parts or prints to P&J for tooling recommendations and estimates.

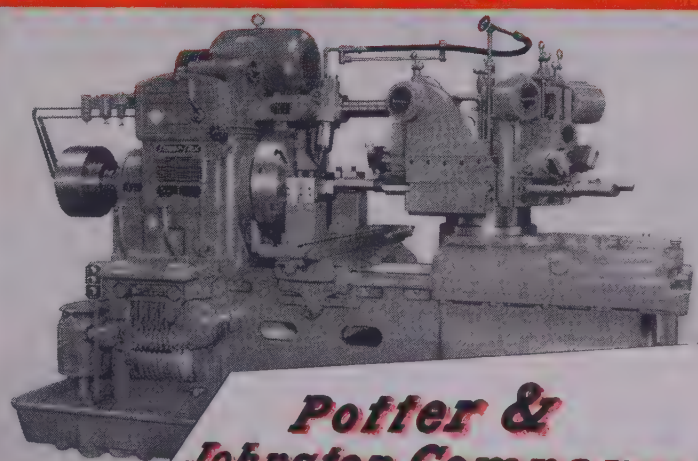
3 SEPARATE JOBS

RETAINER	SHEAVE	PISTON
		

3 SEPARATE OPERATIONS

RETAINER	SHEAVE	PISTON
Rough turn hole Rough turn dia. Rough turn O. D. Face flange Face end Finish-machine above 5 operations Machine groove in O.D. Chamfer hole Size bore hole Cut off chucking ring (Note overhead Cut-off Attachment)	Rough bore hole Rough turn O.D. Straddle face at rim Groove in O.D. Straddle face hub Finish bore hole Form 30° angle in groove Ream hole	Bore under rim Turn hub; face bottom Turn O.D. Rough bore hub Face, chamfer at rim Finish face hub Core drill hole Rough turn O.D. Face rim; turn hub Machine O.D. grooves Face hub; form web Finish face hub Finish turn O.D. Finish bore hole Chamfer; ream hole

MACHINED ON *One* P&J AUTOMATIC
P&J-TOOLED FOR ALL *Three* JOBS



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FUNDAMENTALS of STEELMAKING

NUMBER 17 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

One of the most impressive things about lake transportation is the rapid turn around in port with fast loading and unloading of large ore tonnages. Everything about the business is big and fast. Close scheduling of railroad equipment is necessary to keep up the fast pace and heavy schedules which must be met during each short shipping season

Transportation and Handling of Iron Ore

By P. L. TIETJEN
President
Interstate Steamship Co.
Pittsburgh

PART II

GENERAL average opening date for the season on the Great Lakes is about April 15 and the closing date November 30. At least, this is the regular insurance season. To operate vessels prior to April 15 in the spring and after November 30 in the fall requires the payment of increased additional insurance payments which in many cases are quite high.

One of the most common misunderstandings is the freezing over of the lakes in the fall. Ore operations are stopped at the end of November. The reason is that the ore freezes in the cars and it cannot be dumped or handled, and not because the lakes are frozen. However, there can be bothersome harbor ice. When ore does freeze in the cars at the head of the lakes, the railroads maintain steaming houses where a whole trainload of ore may be thawed out. This is a long process and takes 8, 10 or 12 hours during which time many ships pile up and the delay proves costly. So if any long continued cold spell prevails, ore shipping practically comes to a standstill.

Fig. 11—*The* $10 *million Coast Guard icebreaker Mackinaw, most powerful ship of its kind in the world, runs interference for* 4 *seagoing freighters through the ice-covered St. Mary's river in an epochal midwinter passage from Duluth to Chicago. This ship can break a path through solid, thick ice at* 10 *knots*

Late March and early April operations encounter considerable ice. In fact, ice is generally encountered during most of the month of April in the average year.

Opening of navigation has always been delayed due to the vast ice fields that form each winter. Every effort, including extensive ice breaking operations by the Coast Guard, has been made during the past several years to make possible the early opening of navigation of the Great Lakes in order to meet the heavy schedules assigned the lake vessels.

The United States Coast Guard in 1944 spent $10 million to build a much needed large modern ice breaker at Toledo. The *Mackinaw* is one of the most powerful ice breakers in the world, designed after the most successful types used in northern polar waters and with special emphasis placed on being able to meet any ice conditions that might occur on the Great Lakes.

Dimensions and characteristics of the *Mackinaw* are: Length over all 290 feet; beam molded 74 feet 4 inches; draft 19 feet at a displacement of about 5000 tons; 10,000 diesel electric horsepower driving three propellers, two aft and one forward. The ship develops a speed of 16.2 knots or 18.8 statute miles per hour. All ice breakers are identified by their cutaway bows. The forefoot serves as an in-

Itabira Iron Ore
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ITABIRA IRON ORE is shipped from the port of Victoria, Brasil, to Baltimore, Mobile, and to Sydney, Nova Scotia, as well as to European ports. Inquiries about price and delivery terms should be addressed to:

During the year 1950, the Companhia Vale do Rio Doce will export some 750,000 tons of ITABIRA IRON ORE. The average iron content of this compact, blue hematite is 69%.

The hard structure of the ore, its high iron content and its freedom from impurities make it ideal as a substitute for scrap in charging the open hearth furnace. Proportions of 60% hot metal, 25% scrap and 15% ITABIRA IRON ORE have yielded excellent results.

Used as feed ore, four tons of ITABIRA IRON ORE fed into a 160 ton heat at the seventh hour have saved as much as one hour per heat. The large lumps sink into the bath and do not float on top of the slag.

COMPANHIA VALE DO RIO DOCE

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Rio de Janeiro, Brasil **South America**

Fig. 13—Thousands of carloads of ore are pushed up to the ore docks from this Great Northern yard at Superior, Wis.

Handling of Iron Ore

clined plane up which the bow slides when forced against an ice formation. The application of some of the vessel's weight creates a bending movement on the formation and acts effectively to break ice. When conditions halt the steady progress of an ice-breaker, it becomes necessary to resort to backing and charging. The action of the bow propeller is that of a dredge in breaking up the ice and moving it aft out of the way. It also creates a turbulence and suction in the water which assists the breaking action of the bow.

On the Great Lakes sheet ice 36 inches thick has been encountered. In addition, ice when broken up has a tendency to form windrows when drifting ice fields come together in open spaces. Windrows 29 feet thick have been measured on the Great Lakes. The beam of the *Mackinaw* is sufficent to open a passage greater than the widest cargo vessel on the Great Lakes. The cutter has operated successfully under the most extreme ice conditions found to date on the Great Lakes such as windrows, and both sheet and drift ice.

Fig. 12—World famed locks at Sault Ste. Marie, permitting vessels to transit from Lake Superior to Lake Huron by way of the St. Mary's river. The two lakes vary 22 feet in water level

The Coast Guard is using a helicopter for observation of ice conditions in connection with the work of the *Mackinaw*. Ability of the helicopter to fly closer to the ice surface than any other plane permits its crew to furnish the cutter with detailed information, thus speeding up the ice-breaking operation.

The United States Coast Guard plays a great part in Great Lakes transportation, as it is charged with the placement and maintenance of all aids to navigation, including lights, buoys and channel markers; also inspection of vessels and certification of seamen. Their cooperation has made possible the many records established by the industry. Their prime duty is to protect human life and prevent property loss.

The St. Mary's river forms the outlet of Lake Superior, connecting it with Lake Huron, a distance of 63 to 75 miles according to the route traversed. The rapids of the St. Mary's river is located about 14 miles below the head of the river at Point Iroquois and the fall is about 22 feet average.

The United States government, under direction of Army engineers, has improved one way traffic for a width of 300 feet and two-way traffic for 600 feet and other critical places 1500 feet throughout the river by a tremendous amount of dredging and construction of two canals, four locks and compensating works at the falls.

Navigation around the rapids at Sault Ste. Marie is provided for by canals and locks on both the United States and Canadian sides. Poe lock was opened in 1896 and has a limiting depth of 16.6 feet and limiting width of 95 feet. The Davis lock was opened in 1914 and Sabin lock in 1919 both of which have a limiting depth of 23.1 feet and a width of 80 feet. The McArthur lock was opened in 1943, has a depth of 31 feet and a width of 80 feet. The Canadian lock, built in 1895, has a limiting width of 60 feet and depth of 16.8 feet.

Tonnage passing through these locks in 8 months is greater than the combined total traffic of both the Panama and Suez canals in 12 months. It requires an average of about one hour to lock through from the time the ship stops at the upper pier until

Fig. 14—Loading iron ore at a upper lake port. Spouts carry ore to the ship's hold from the bins shown at left which are filled from a railroad trestle located above

it is ready to leave the lower pier. During the 94 years the canal has been in commission the yearly traffic has increased from a minimum of 14,505 tons in 1855 to 120,199,479 tons in 1942.

Responsibility for the marvelous improvements and maintenance of this great waterway has been carried out by the United States Army Engineers over a period of many years. The many fine deep harbors, breakwalls, piers and deep channels, many cut out of solid rock, stand out as spectacular achievements. The fine solid mammoth locks at the Soo will always be representative of this branch of the government.

One of the most impressive things about this business of lake transportation is the rapid turn around in port with fast loading and unloading of large ore tonnages. Everything about the business is big and fast. Much scheduling of railroad equipment is necessary to keep up the fast pace and heavy schedules which must be met during each short season. During the last war figures show that over 92,000,000 gross tons of iron ore was transported in one season.

Ore docks at the upper lake ports were gradually enlarged to meet the requirements of the trade and are 75 to 80 feet above the water and about 2000 feet in length. On top of this trestle whole train loads of ore and locomotives move back and forth. The early docks were timber, but concrete and steel have gradually replaced wood in construction of the modern facilities. The ore is moved in from the mines in specially constructed railroad cars to the top of the trestle. It is then dumped into bins of 1 to 5-car capacity and this is where mixing is done of the various grades to give the desired quality. This movement is timed so that all the ore necessary for a cargo will be ready for loading on arrival of the vessel. This scheduling and handling of ore at the loading dock is a complicated problem. There are now 9 ore-loading docks on the lakes. Dispatch in loading is truly amazing, average loading time being about 5 hours for a 12,000 ton cargo.

The record ore loading occurred at Two Harbors, Minn., when 12,508 gross tons were loaded in 17 minutes into the steamer *D. G. Kerr* on Sept. 7, 1921.

To accomplish the blending and grading of iron ore on a huge scale is a complex problem and is only gained by careful checking to see that each pocket along the dock is blocked out as carloads of different grade ores are dumped into it. Trainloads are usually blocked in groups of five cars for each pocket.

This process of filling the pockets achieves a fair degree of mixing and blending. Then as a full series of pockets selected for a vessel's cargo pours down the spouts and into the hold, a further evening of the values takes place. Object of course is to keep the actual iron content of the cargoes up to standard. There are about 150 different recorded grades of American ore.

Ore bins are cylindrical tanks with a sloped bottom leading to an opening with a slide or gate to

Handling of Iron Ore

the chute. Raising and lowering of these chutes and the opening and closing of the gates are controlled from top of the ore trestle at an operating platform. Sometimes it is necessary to have men known as ore punchers to poke ore down if it sticks. It is also necessary to station punchers on a platform at the door opening at the bottom of the bin to keep the ore running in the chute if it is sticky.

An interesting and outstanding achievement is the length of trains run from the mines to the loading docks. Powerful locomotives haul huge trains of loaded cars. It is claimed that the longest trains in the world are moved, often totaling 180 to 185 cars, each carrying approximately 65 tons of ore.

It has been stated that early unloading docks were crude and vessels were required to be in port for a long time. Time consumed in bringing the cargo from upper lake ports did not allow for speeding up to any appreciable degree and the only way the round

Fig. 15—Ore pouring from spout into ship's hold. Note arched construction above sidetank which eliminates beams and stanchions in cargo hold. Farthest pile at last hatch is approximately completed and shows the tremendous weight of ore

trip could be shortened was to cut down on time required for cargo discharge.

With this in mind various types of unloading machines were designed and erected. Progress to this goal was marked by various steps.

In 1880 Alexander E. Brown developed a single cable-wired rig which served the combined purpose of hoisting the bucket from the hold and conveying it to storage. It was installed on the N. Y. P. & O. docks at Cleveland. This plant consisted of five rigs with the machinery all in one house. The front pier of these machines was movable and thus they were the first cableways of this type ever built in our country. They reduced unloading time remarkably, but naturally, as the tubs were small and had to be filled by hand, large hourly capacities could not be attained, but as ore could be taken from a number of hatches simultaneously, time of unloading was greatly reduced.

Next came the Brown Tramways, which were only hoisting machines and could not dig the ore in the vessel hold. Each machine had four buckets which were placed in the hold and filled by hand shoveling. When filled, the bucket was hooked onto the machine and hoisted out of the hold. The bucket ran on a trolley against a track stopper into position over a railroad car. The load was dumped by a trip man standing on the deck of the vessel by use of a long trip line. There were no scales on the machines, so it was up to the trip man to figure when enough ore was in the car. The light weight cars were brought back to the dock for more ore and the heavy cars were lightened. This type of unloader, located at various lower lake ports, unloaded all types of vessels, including sailing schooners, small wooden steamers, barges, whalebacks, and the small steel steamers which were the forerunners of today's giant carriers. This type of equipment was also able to carry

Fig. 17—At lower lake docks giant Hulett unloaders relieve carriers of their cargo, scooping out 20 tons with each bite. Cleveland is the largest ore receiving port

Fig. 16—View of a standard Hulett unloading dock showing larry cars and railroad cars for outbound ore shipments

ore back to the dock storage piles.

It was only natural that with growth of the demand for iron ore efforts should be put forth to develop an unloading machine with a self-filling bucket. In 1899 George H. Hulett induced the Carnegie Steel Co. at Conneaut, O., to install on its dock a new type of unloading machine having a bucket that filled itself.

Other types of unloading machines utilizing this same idea of a bucket that could dig the ore in the hold of a vessel were brought out in the early 1900's. Prominent among these machines were the Brown fast plants and the Hoover & Mason clams.

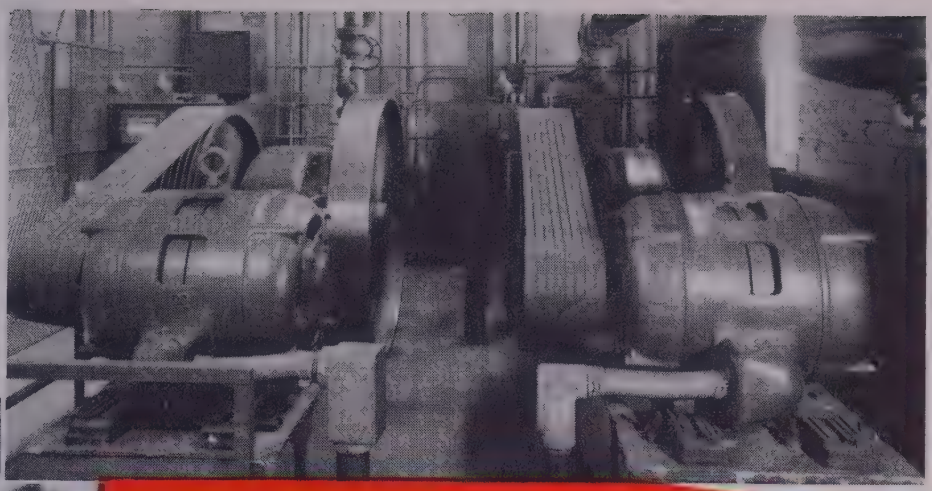
Brown electric unloaders were located on many of the lower lake docks. Briefly described, this type unloader consists of a rigid, steel, box-like frame with legs forward and aft, which span several railroad tracks. Within the box frame is an ore bin, which is directly above the car tracks below and which is supported on scale rods so that ore in the bin can always be weighed first and then loaded into a car directly from chutes at the bottom. Over the bin is a carriage, or trolley mounted on wheels which run on an ordinary track above. A small cab is attached to this trolley in which the operator stands, and electrical machinery is provided on the trolley for hoisting, lowering, opening and closing a large, two-jaw automatic bucket for digging ore out of the boat's hold. To allow the bucket and trolley to move out over the hatchway of a boat, a long extension track known as the boom or apron is hinged at the front end of the frame and can be raised out of the way when it is not in use. The entire unloader travels upon tracks and can be moved back and forth along the dock so as to line up with any hatchway.

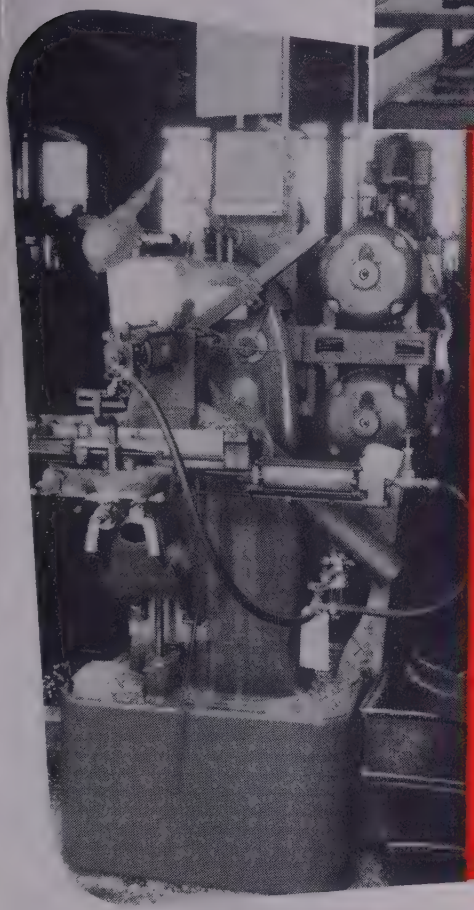
Buckets are entirely automatic in their opening and closing, the operator in the trolley controlling every movement by means of cables running down into the bucket frame. They are made in various sizes from 5 to 15-ton capacity.

Another machine that has proved very efficient is the Hoover & Mason unloader, some of which have been installed on various unloading docks. One of the fastest is in operation on the Pennsylvania

Two Century 100 horsepower squirrel cage motors drive air compressors which furnish air for portable tools, industrial furnaces, air lifts, air chucks, moulding machines, cleaning, etc.

Two Century 1 horsepower totally enclosed squirrel cage motors operate this automatic miller which produces 700 pieces per hour. Enclosed design protects against flying chips.





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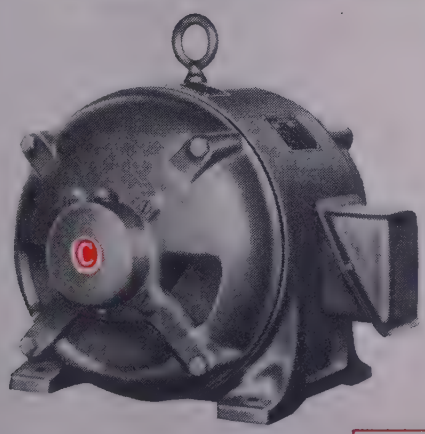

Popular sizes of standard ratings are generally available from factory and branch office stocks.

Century motors are available in a wide range of types, in sizes from 1/6 to 400 horsepower, single phase, polyphase and direct current. Where atmospheric conditions create a hazard, Century motors are supplied with splash proof, totally enclosed fan cooled or explosion proof frames, according to the nature of the hazard.

The two illustrations are typical of the widely varying applications, where Century motors furnish dependable power.

Century motors are built to stand up under the toughest operating conditions. Rugged frames, accurate machining, large shafts, accurate alignment, good mechanical and electrical balance—all contribute to their outstanding performance.

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Handling of Iron Ore

Railroad Co.'s dock located at Ashtabula, O. This battery of six unloaders was installed in 1908 and is very similar in general outline to those previously described as the Brown fast plant and perform their work in much the same manner. Important points of difference are in the weighing hoppers, the buckets themselves and in the method of moving the machines along the dock. The later arrangement is very simple and is accomplished by pulling-in ropes that lie lengthwise along the dock and are fastened to its opposite end. This is accomplished by machinery mounted on the legs of the machines themselves. The buckets are also very simple and their action suggests huge scissors operated by cables, which cut off a huge chunk of ore at its lower end. These buckets have a great spread when they are open, enabling them to reach ore between the hatches of the boat. When they are dropped through a hatchway they stand lengthwise of it, but when inside of the hold they can be turned around at right angles to the hatch.

The bucket drops its load into a bin, from which it can be fed and weighed onto cars below for direct shipment. This is rapidly accomplished by two cylinders which roll the ore out of the bin into the car. A large dial indicates amount of ore in the bin, and when the correct amount of ore has been fed out, the operator lets go of a rope and the flow of ore stops. In this way a whole trainload of cars is readily loaded to capacity. Ten cars have been frequently loaded in 15 minutes. If the ore is for storage on the stock piles the machines dump into an ore trough that runs back of the machines the length of the dock.

From this trough the ore is picked up by the bridge, a structure 550 feet long which not only deposits the ore on the storage piles but also loads from stock pile to railroad cars for shipment.

At Conneaut, O., five Hulett unloaders, each able to handle 20 tons at a time, perform daily miracles. These were installed in 1912 and carry tremendous loads from vessels to railroad cars with superhuman ease.

Fig. 18—Ship at the dock is loaded and vessel in background is light of cargo. In foreground is seen the storage pile of ore at a lower lake port for use during the winter when all Great Lakes shipping is suspended

REPRINTS AVAILABLE

REPRINTS of previous articles in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department. STEEL, 1213 W. Third St., Cleveland 13, O. Subjects covered over the past few months include blast furnace, open hearth and electric furnace practice, tool steels, roll design, coke production, plates, sheets and strip, tin plate, structurals and rails, scrap, bessemer steel, butt and lap weld pipe, seamless tubing and stainless steel.

A record was made by this port when it unloaded 14,275 gross tons of iron ore from the steamer *D. G. Kerr* in 2 hours and 45 minutes on June 8, 1943.

These giant unloaders, at rest resembling huge elephants, are mounted on rails and built to move from one end of the dock to the other end, a distance of some 1000 feet. Main part of the machine is a strongly built steel frame supported by legs in front and rear which span four of five railroad tracks running underneath. The machine has a walking beam with a rigid steel leg hung at the end which is lowered and raised from the hold of the vessel by cables and electric motors.

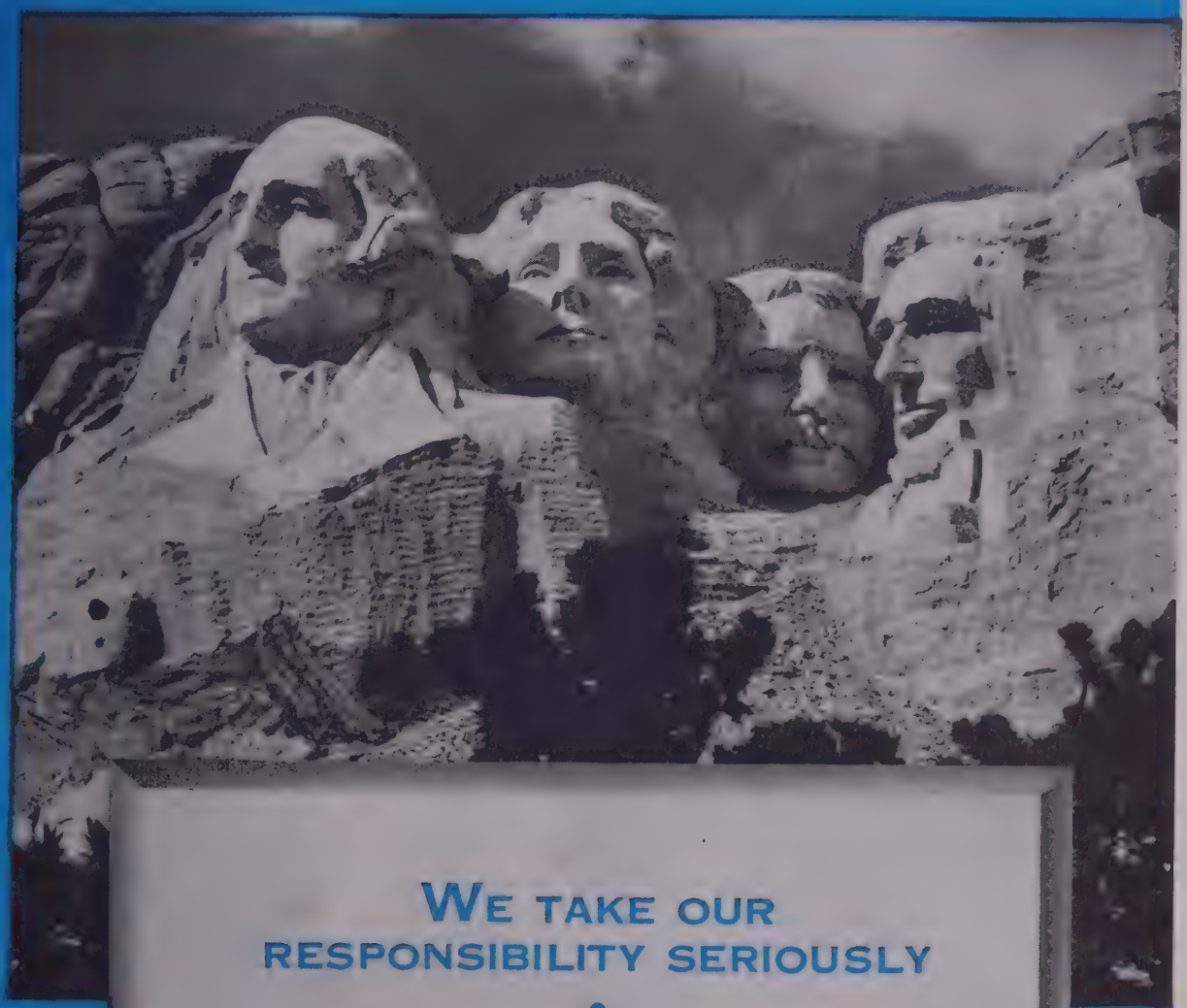
The bucket is attached at the end of the leg and the operator, whose cab controls are located in the leg above the bucket, rides down into the hold of the vessel and the bucket grabs 15 to 20 tons of ore. The machine is counterbalanced so that the raising of the bucket from the hold of the vessel is accomplished by pulling down the back end of the walking beam with four hoist cables.

The receiving hopper, having a capacity of 60 tons, is now placed close to the front of the machine. The operator coming out of the hold of the vessel with a full bucket of ore dumps into this hopper and is ready for another trip back to the vessel hatch. Less than a minute is consumed from the time he hoists out of the hold until he is back for another grab. He can rotate the leg so that the bucket can be swung forward and aft in the vessel and reach the ore between the hatches.

From the receiving hopper revolving disks move the ore into the larry car hopper whose operator weighs the ore as he takes it from the receiving hopper. In loading of cars for direct shipment he is able to determine the exact weight of the ore loaded into a railroad car. If the ore is to be placed on the dock for future shipment, the larry car operator dumps it into a concrete pit which runs the entire length of the dock.

In the loading of cars for direct shipment under the Huletts a haulage system or electric mules are used. By either of these methods cars may be spotted on the dock under the machine and thus moved as needed.

Each dock is equipped with a stocking and loading bridge, usually over 600 feet long and about 125 feet high. Ore that has been placed in the pit by



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the larry cars is picked up by a 15-ton bucket on the bridge and carried back to the various dock stock piles. The bridge also lifts ore from the storage piles and loads it into cars for shipment. A great deal of this loading from dock is done during the winter season when lake navigation is halted by weather conditions. In order that the ore may reach the furnaces in good condition during cold weather and not be frozen in the cars, calcium chloride solution is sprayed on the sides of the cars and on the ore itself during loading operations.

Ore storage spaces are usually about 1200 feet in length and 550 to 600 feet wide so that hundreds of thousands of tons may be stored depending on the number of various grades to be placed on the dock. General practice is to keep the various ores separated by walls built of old railroad ties. Heights of these piles vary with the tonnage to be stored but approach a height to give bucket and bridge clearance.

This stock-piled ore at the lake docks is loaded by means of the ore bridge into railroad cars and shipped as required by the mills and furnaces. When these cars arrive at the mills, they are unloaded by a car dumper which is the most modern quick method, or by the older trestle method, or perhaps by clam shovel bucket.

All modern car dumpers are side dumping mechanisms of the lift type. The car is raised and tipped over sideways for dumping. These machines are movable, that is they can be shifted up and down the length of the mill storage pile. Desired design of these dumpers can be easily adapted to any plant storage pile conditions. This storage or stock pile at the mill or steel works is serviced by one or two bridges which handle ore from the dumpers to the piles or charges.

Rough Casting

(*Concluded from Page* 79)

operations the work is placed in dolly truck holding 500 pieces for removal to the plate department where it receives a sodium stannate (tin plating) dip to micro 22-25.

Briggs & Stratton maximum daily production per 8-hour shift, involving the various sizes of aluminum pistons, is: (using double production line) 4000 2-inch pistons; 1600 2¼-inch pistons; 1400 2⅝-inch pistons; 1200 3-inch pistons. Tolerances involved are 0.001-inch, except for the diamond bore of the wrist pin holes, which is 0.0025-inch. Operators attend the dimension check and the work receives 100 per cent inspection after plating. Machines are equipped with dial indicators for operator measurement check.

Extends Ingot Mold Life

FLAT carbon steel strip, separated by corrugated spacer strip of the same metal, is reported to materially increase life of ingot molds and stools when placed in mat form in the ingot bottom. Diameter of the 1½-inch thick chill mat is determined by the specifications of the ingot mold, but reportedly need not cover the entire bottom.

Mat is lowered into place on the stool in the center of the ingot mold bottom before pouring is begun. When the ladle nozzle is opened, the stream of molten metal impinges on the mat and is broken up into numerous small particles due to the great number of exposed steel edges of the mat. Solidification of these fragments is immediate upon contact with the chill surfaces, thus preventing the molten metal from striking the stool.

Method was developed by William E. Schmertz, steel plant consultant, Pittsburgh, in co-operation with United States Steel Corp. It is said to prevent the development of "pot holes" in the stool at the point of impact of the hot metal. With the absence of potholes, the stool may be used longer. An additional advantage is that ingot bottoms will not become round, thus enabling better handling in the soaking pit and reducing uneven heating.

Chill mat also tends to curb the outward flow of the metal which causes "leakers," thus making ingot stripping easier. By reducing initial splash, scabs are minimized, as are seams and inclusions in the ingot. According to John P. Ludgate Associates, steel mill equipment engineers, Pittsburgh, the chill mat offers advantages in the casting of basic or comparatively low carbon steels and is becoming increasingly important in preventing splash when pouring acid ingots of higher fluidity. Objections to the usual mold wash or spray compounds are eliminated through its use, it is stated.

Many different grades of cast iron and cast steel, as well as copper have been tried for stools in an attempt to prolong ingot mold and stool service. It is from experiments with copper indirectly that the idea of the new chill mat was conceived. Copper was found to be a relatively low fusion point metal which served very well as stool material. It did not melt away due to its high heat induction coefficient, but the fear of contamination precluded its use, although the principle was clear.

Inspections of ingot bottoms poured with chill mats have disclosed areas where the molten metal has not reached the stool at all, but was completely frozen by the chill surfaces. Metal of the stool absorbed sufficient heat to prevent the mat from becoming molten, retaining its original shape and form and being discarded in this bottom crop of the ingot. It is for this reason the metal used in the mat need not have exactly the same chemical characteristics as the ingot metal. Frequent use has shown that it will not come to the top of the ingot and that it is possible to open the ladle full force without damage to steels during pouring.

Vessel Resists High Pressures

OCEAN water pressure down to a depth of ½-mile below the surface will be simulated by a 150-ton pressure vessel, built by Babcock & Wilcox Co., New York, for testing of underwater equipment at the Naval Ordnance Laboratory, White Oak, Md. A heavy horizontal cylindrical sheet of steel plate, the vessel has one end sealed permanently and the other closed by a hydraulically lifted door. Three 7-inch ports of heavy glass along the sides of the shell allow observation of the interior while testing is taking place.

Underwater apparatus and instruments which are exposed to high pressure and other submarine equipment such as divers' suits, can be tested in the vessel. A transfer tank underneath the vessel stores water when not needed for testing. After being filled, additional water is pumped in to raise the pressure, or pumped out to lower it.

Walls of the 36-foot long vessel are 4 inches thick and inside diameter is 8 feet. Sixty-one tons of water are required to fill the vessel which will withstand a pressure of 1000 psi.

Shell itself consists of three courses, a shell head and shell ring, each joined to its neighbor by a girth weld. Rolled plate of 70,000 psi tensile strength was used.

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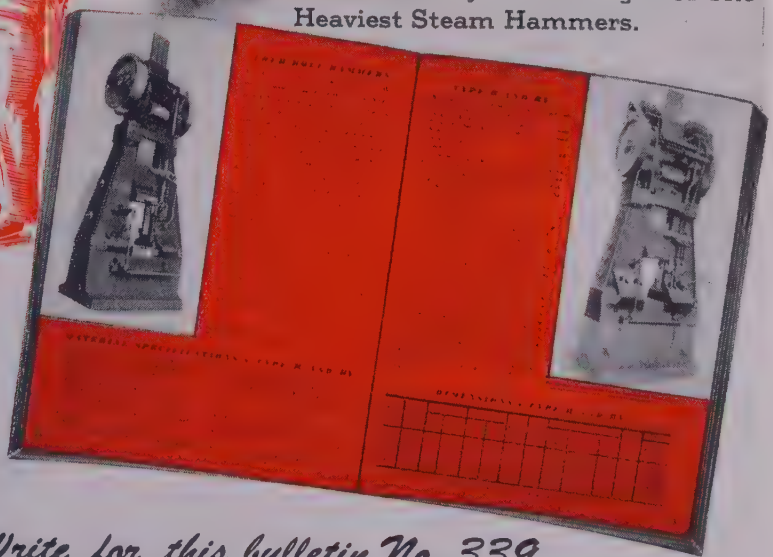

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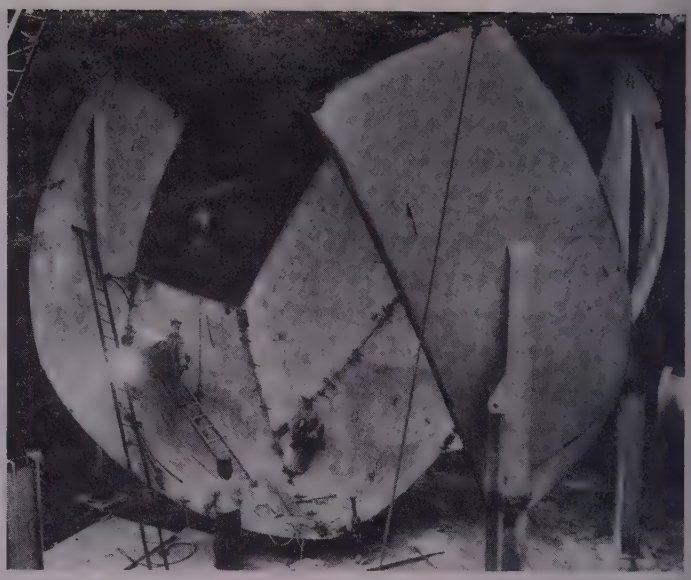
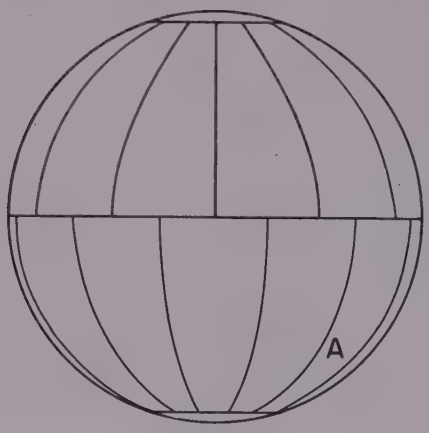
Fig. 1 (right)—Sections of the icosasphere during erection. Tack welding is in progress

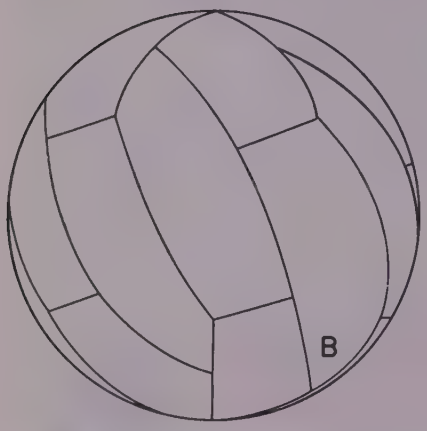
Fig. 2 (below)—Conventional plate layout (A) of orange peel design and layout of an icosasphere (B), both of 28.75 feet inside diameter. Note that on the former plate sizes are smaller and roughly triangular, while in the icosasphere they are more rectangular and larger, resulting in much less scrap in fabrication and less welding during erection





TANK PLATE LAYOUT METHOD

Materially Reduces Scrap Loss and Welding Time



NEW method of predicting the flow or displacement of materials in plates and sheets which are bent, formed or drawn in such a manner that plastic flow occurs in the metals is reported by Pittsburgh-Des Moines Steel Co., Pittsburgh. Development is instrumental in reducing considerable scrap loss and welding time in designing and building spherical tanks and other double-curved plate surfaces. It is applicable to any formed work where plastic flow is involved—such as shaping wind tunnel flares, nozzles, contraction pieces, hemispherical, elliptical and toroidal tank bottoms and in any other dished, pressed, drawn or warped plate work.

Representing another tool for the research worker in obtaining solutions to layout problems, the process consists first, of forming the desired object in a suitable heat-softened plastic material which is allowed to cool between dies to the desired shape, then trimming edges of the piece to the outline required and relaxing it by heating to a point where the piece can be flattened to assume the outline of a properly shaped flat piece.

Plastic Checked—Operator shown in Fig. 3 has pressed a piece of Plexiglas to form one of the plates of a spherical shell and is checking it for accuracy. This determination is being made in the research laboratory of the Pittsburgh-Des Moines Steel Co. at the Mellon Institute of Industrial Research, Pittsburgh. At the left is shown the pressing form; other pressed pieces may be seen in the foreground.

Most common spherical tank plate layout is known as the "orange peel"

Fig. 3 — After having been formed in the mold at left, pieces of Plexiglas are being checked for accuracy

esign; it usually consists of a top nd bottom saucer with one or more ourses of approximately vertical lates in between. These vertical lates are wider near the center of ne sphere and taper towards the op and bottom so that they resemble range peels. Although scrap may be educed by cutting two of the plates rom one rectangular plate, the finished product is much narrower than he economical width resulting in a considerable increase in the footage of welded seams over that which would result if only one sphere plate is cut from each rectangular plate. If plates of maximum width were cut singly to form the separate plates, scrap would be excessive.

It was some time ago that a cubical layout was developed in which rectangular plates were laid out on the sides of an imaginary rubber cube circumscribed by a sphere. Cube was then expanded until its faces touched the spherical shell. In expanding the cube to fit the sphere, all of the edges of the plates become curved, but the plates will be more regularly rectangular in shape than the orange peel plates and the amount of scrap will, in most cases, be reduced.

Five Polyhedrons—Faces of one of the five regular polyhedrons must be the basis for any layout of plates for a sphere which is to have a repeating pattern. These are the tetrahedron with four rectangular faces; the hexahedron, or cube, with six square faces; the octahedron with eight triangular faces; the dodecahedron with 12 pentagonal faces; and the icosahedron with 20 rectangular faces. The latter may be built without scrap loss for the triangles may be alternated and cut from a rectangular plate without waste. Four adjacent surfaces of an icosahedron may be flattened and they will form a parallelogram.

The entire surface of an icosahedron may be formed from five of these parallelograms. Knowing that the spherical shell was formed by five parallelogrammic units, it was determined that this layout might be the best one possible from a standpoint of scrap loss. Although a sphere may be divided into 20 equilateral spherical triangles, it is not possible to divide the surface of a sphere into more than these 20 triangles for the same reason that it is not possible to have a polyhedron with more than 20 identical faces.

With reference to the above basic data, the icosasphere is then a sphere laid out along the expanded lines of four adjacent faces of an icosahedron. Five properly shaped and dished plates will form a complete sphere, these plates being cut from one rectangular plate with a very small scrap loss. It is necessary to further subdivide the five parallelogrammic units as the size of the sphere increases. Designs have been prepared based on subdividing each side into two, three, four and eight subdivisions.

Economical Plate Size—It is usually not economical to use plates wider than about 100 inches because of the higher cost of steel and because of the additional cost and difficulty of handling the large plates. Assuming this maximum width, the largest sphere which can be built from five parallelogrammic units is about 14.8 feet in diameter. Therefore to obtain the advantages of this method in larger spheres, it is necessary to subdivide each unit into several smaller units.

Formed of only 20 plates and supported on five columns is the icosasphere showing during erection in Fig. 1. Tack welding is being performed on the 32-foot 5 inch ID tank during erection. The sphere itself was erected in a single day, but the seam welding took more time. Upon completion the shell was tested to 100 psi hydraulic internal pressure. It was designed for an external working pressure of one atmosphere, or 14.7 psi. The high internal pressure test of about 6.8 times the external working pressure of the sphere was for the purpose of removing flat spots and rounding out the surface of the sphere so that it would more effectively resist the external pressure.

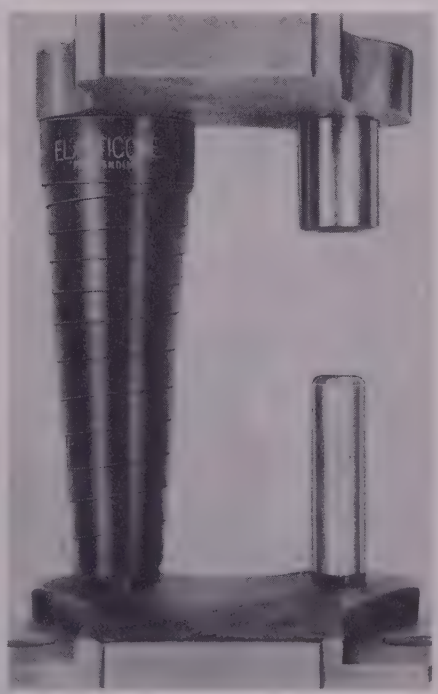
Preparation by Flame Cutting—Butt welds are used in fastening the tank sections together. The plates are prepared by flame cutting, making a single bevel with the shoulder on each edge. Plates are then tacked together leaving a space of 1/16-inch between the shoulders. The included angle of the bevel varies with different thicknesses and the most economical bevel must be determined by tests.

The first continuous welds are placed on the bevel side in the bottom of the bead groove. After several beads have been welded, the joint is burn-gouged on the back side, removing the shoulders and the imperfect part of the first bead. Back side is then welded and the front side is completed.

Flame-gouged joints are faster to make and less costly than double-U-grooved joints, the principal saving being in the plate edge preparation and in lower cost of the flame gouging as compared with back chipping to clean up the root.

Experience has shown that the saving is about 8 per cent for the vertical joint, 16 per cent for the horizontal joint and 24 per cent for the down and overhead joint. Another advantage for this type of joint is that in the case of down and overhead seams, a much larger percent of the weld metal can be deposited in the down position with a resulting saving in time and cost. A sphere was recently completed using this type of welded joint in which the plates were 2⅝ inches thick.

SPRING PROTECTS BUSHINGS: Pin and bushing life on punch press die sets is said to be increased by as much as 20 to 40 per cent with the installation of these Elasticone spiral-wound flat steel springs of conical shape. Made by Central Safety Equipment Co., Philadelphia, the springs, besides eliminating the pinch-point—a hazard to die setters, maintenance and operating personnel, are easily installed, their own spring tension holding them in place. All adjustment is automatic



Stainless Clad Copper

(*Concluded from Page* 81)

Fig. 5 is a chart showing the thermal conductivity of various base metals with varying temperatures. The tests described in Figs. 1, 2 and 3, as discussed above, show that thermal conductivity alone may not be a true measure of lateral conductivity although it forms a useful guide.

Heat Conductivity Excellent—Lateral heat conductivity of Rosslyn metal matches that of copper and in many cases surpasses it. There is a wide range of physical as well as corrosion and heat resisting qualities to be obtained with the use of the material. Relative thickness of the copper can be raised or lowered so as to meet conductivity refinements for certain applications. It is logical to suppose that where high physical strength is required, enough copper proportion can be furnished to give the necessary lateral heat conductivity, and the balance of the cross section of the stainless-copper-stainless material can be furnished in the stainless alloy best suited for the temperature and corrosion conditions that may exist in any particular application.

One of the most dramatic and timely developments in the use of the laminated metal is high temperature work in connection with power units for airplanes of various types, including jet aircraft, and for other types of gas turbines. The demands on a metal used in the combustion chamber and exhaust systems of this type of power plant are exacting. Here again, a logical answer is to use a high alloy material for strength and resistance to oxidation and to furnish it in a composite section combined with the master conductor, copper. The fact that this can be done on a commercial basis has led to extensive experimentation with Rosslyn metal.

Fact that the amount of copper can be varied from the usual thickness of 1/3 means that where certain physicals must be met, a minimum of copper can be applied with the assurance that a predetermined ratio of lateral heat conductivity can be achieved, and a section designed for a particular use which will give longevity to the power unit.

Material Cost Cut—The material also represents a substantial saving in original material cost. It is readily weldable when proper techniques are followed. Where heat transfer across the joint is important, and a weld can be made from both sides, there is no difficulty in fusing the two stainless layers and in drawing the copper layers into such close contact that efficiency of transfer laterally across the joints can be achieved. Where it is necessary to have a 100 per cent joint welded from one or both sides, it is usually in an application where the heat is being applied to the metal over an entire cylindrical section, so that heat transfer across the joint is not so important.

With the use of a high nickel rod and a selected gap in conjunction with the right welding technique, a ductile, corrosion-resistant, 100 per cent joint can be made from one side satisfactorily. This means that the designing engineers in the aircraft and power plant industries have a new material to work with which will give them economy, longevity, a saving in strategic alloy, and a generally more satisfactory and safer power plant.

Affords Efficiency—In food processing industries, use of the clad metal is now under way because of the efficiency it affords. It is not unusual for a stainless kettle to last for 20 years. When considering the volume of food processed through the kettle during its life, cost per gallon for the kettle is lost. Cost of operating it with steam and the necessary labor is so much greater that the cost of the kettle spread over the product put through it is significant.

A recent experiment showed that the laminated metal could be stretched so as to reduce the gage on the flat bottom of a cold drawn section by 25 per cent. In a draw made recently, the hold down pressure was such that the metal could not feed into the section. The metal drew to the place where the load necessary to draw metal down under the ring was greater than that necessary to draw metal around the bottom corner radius up into the vertical sides of the pot. This occurred, and 1 inch of the vertical side of the pot was drawn around the corner radius from the bottom without breakage.

When cold drawing, it is important that the metal be considered as a different material than those formerly used. Drawing compounds, hold down pressures and general shop practice should be adjusted to suit the particular qualities of the metal.

Kinney Process Used—In order to obtain best results in the rolling of this combination of austenitic stainless steel and copper in clad form, it was necessary that the American Cladmetals secure rolling equipment, Fig. 4, especially designed for the problem at hand. These hot mills are designed to use driven top and bottom 28-inch diameter rolls, 60 inches long with the finishing stand designed so as to accommodate shorter rolls when necessary. Drive and reduction on these mills are arranged so that a comparatively slow heavy pressure will be applied to the rolling units. The mills are of the 2-high type; however, unlike the conventional 2-high mill as noted above both top and bottom rolls are driven, both on the breakdown mill and on the finishing mill.

With the equipment especially designed to be operated in carrying out the Kinney process of bonding metals, very good yields are obtained in a high quality product, both as to the bond and as to surface and drawing qualities.

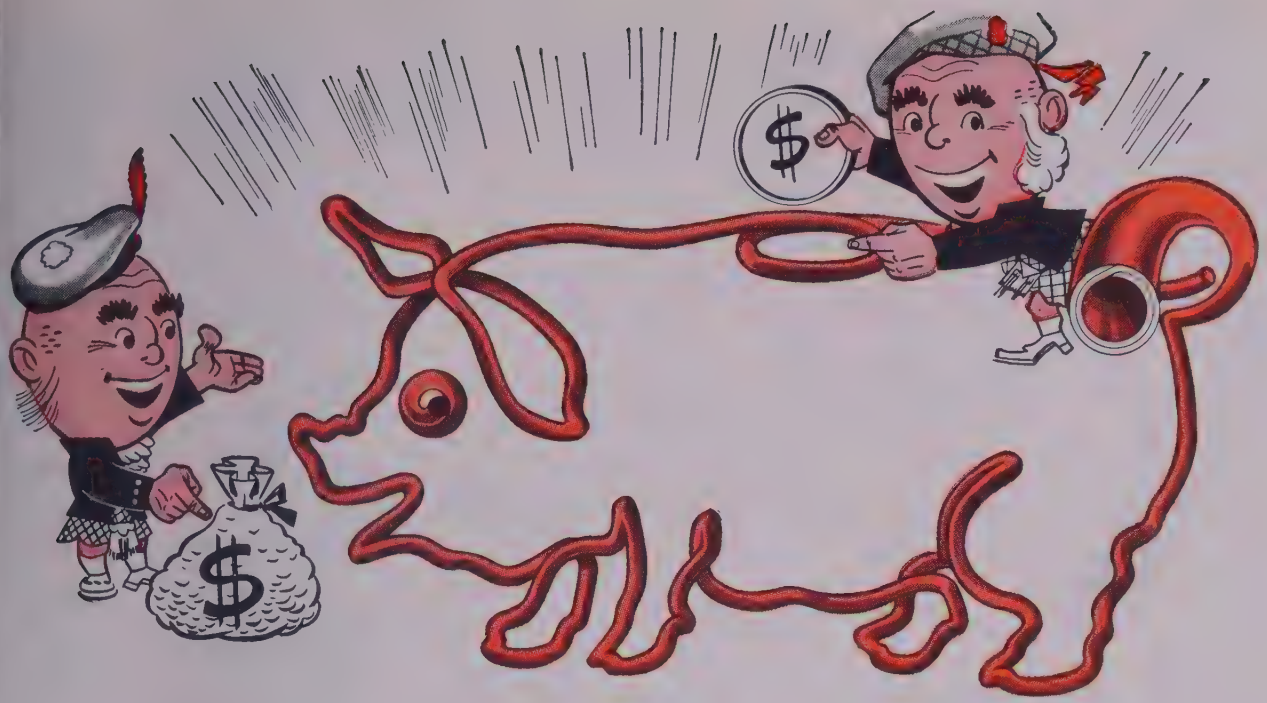
Basic rolling units are now in operation, and the facilities for delivering hot steel to the mill are being expanded gradually. As the capacity to deliver rolling units heated and ready for rolling is increased, and the facilities behind the mill for handling annealing, pickling and so forth come into operation, the capacity of these mills will be in the neighborhood of approximately 1000 tons per month.

Rolling units for Rosslyn metal are prepared by a special machine designed to be used in conjunction with the Kinney manufacturing process, and adequate capacity is planned for this very important step in the manufacture of cladmetal. The process controlled by American Cladmetals makes use of relatively thin components in assembling the rolling units. A special type of weld for welding the assembly is satisfactory in that the assembly will go through the rolling operation and remain intact.

Performs Sixty Operations

DOUBLE-DECK system is used to perform 60 drilling, reaming and tapping operations on the sides and ends of cylinder and valve housings in a new six-station transfer machine. Part is first loaded into the lower deck, where 50 drilling, reaming and tapping operations are performed; it is then turned 90 degrees and placed in the upper deck where the remaining 10 operations are completed.

Built by Greenlee Bros. & Co., Rockford, Ill., the machine holds close tolerances required during the machining operations by locating the part in both decks with dowel pins and holding them in place by pneumatically-powered wedge clamps. Work pieces are transferred manually from one station to another through a continuous chain system. Double-indexing is impossible as a locking device functions until the cluster-type heads have completed the machining cycle.



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4 Bundyweld comes in standard sizes, up to ⅝" O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES

Cambridge 42, Mass.: Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.:*** Rutan & Co., 404 Architects Bldg. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 3628 E. Marginal Way • ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 881 Bay St.

BUNDYWELD NICKEL AND MONEL TUBING IS SOLD BY DISTRIBUTORS OF NICKEL AND NICKEL ALLOYS IN PRINCIPAL CITIES

Continuous Casting

(*Concluded from Page* 77)

got bars. One of these units is a unique assembly composed of a heat chamber joined together with a specially constructed high capacity preheater, cool chamber and quench tank. The other two furnaces are of the same type. They are duplicates, within limits—one unit can handle coiled sheet and bars while the use of the other furnace is restricted to coils—but do not incorporate the preheater found in the modified unit. While furnaces are designed for maximum production as high as 800° C, and uniform annealing conditions at temperatures as low as 250° C, in production bar stock is annealed at 750° C and coiled sheet stock at 570° C. Furnace speed ranges from 1.8 to 7.8 fpm and pass line is approximately 3 feet above the floor level. Prepared atmosphere gas is not used in any of these furnaces.

Two 4-high mills, one for cold rundown and the other for cold finishing were both designed and built by United Engineering & Foundry Co. and represent the most modern and complete cold rolling equipment as yet designed and placed in operation in the brass industry. The run-down mill is a 16-inch and 34 x 34-inch unit capable of rolling 2000-pound bars 29 inches wide and ⅜-inch thick by 68 feet long down to coils 0.050-inch thick using an up-coiler after the mill.

Automatic Material Handling—Coil handling equipment used with these mills was designed and built by Logan Co., and is mostly automatic in operation with fully interlocking features for sequence operation of equipment as the coils progress around the mill. After coils have once been formed, subsequent rolling is always in coil form. The front end of the mill is provided with a charging car to take coils from the conveyor system and deposit them in a coil box to be fed to the mill through pinch rolls and sticker entry guides. This mill is also arranged to operate as a finishing unit, with an expanding payoff reel on the entry side which receives coils from the same charging car mentioned above.

The finishing mill is the same size and design and handles the same coils as the run-down mill except in lighter gages on the up-coiler. The reel is for metal down to 0.011-inch thick. It is provided with the same equipment and conveyor system as the other mill, except it does not have the vacuum cup crane and driven roller table as it is used for coils only.

Both mills utilize a common oil cellar in which are located the roll cooling systems, the metal lubrication system, the oil lubrication system for gear drive units, the lubrication system for the mill bearings, and the hydraulic system.

Electrical equipment for the two units was built by Westinghouse Electric Corp. Main drive equipment for each mill is essentially duplicate in character with only minor differences in the auxiliaries. The drive for each mill consists of one 1250 hp, 600 v, 0/400/1000 rpm, dc motor for the mill drive, one 5 hp, 230 v, 400/1000 rpm, dc for the wiper roll drive, one 75 hp, 230 v, 300/1200 rpm, dc motor for the blocker drive and one 50 hp, 230 v, 400/1200 rpm, motor for the upcoiler drive. Special means for inertia compensation are provided to assure constant tension under conditions of acceleration and deceleration.

Much of the conveyor equipment for handling brass bars and coils was furnished by Mathews Conveyer Co. Waterbury Farrel Foundry & Machine Co., furnished the heavy-duty slitting line, medium-duty slitting line, and light-duty slitting line, pickling and inspection lines. The heavy-duty line handles ⅜-inch material, hard or annealed, up to 30 inches in width and the medium-duty line may be used for either conventional slitting, in which the metal is fed through, or for "pull through" slitting. It is designed to handle hard or annealed ⅛-inch brass strip or sheet not over ⅛-inch thick and 30 inches wide, in coils weighing up to 2000 pounds. The light-duty line handles 0.032-inch to 0.010-inch brass, 30 inches wide in coils up to 2000 pounds in weight.

Flame Impingement Utilized — A short bar annealing furnace supplied by the Electric Furnace Co., handles material ranging from 9 feet 9 inches in length up to 42 feet 3 inches in length and anneals at thicknesses varying from 0.40-inch to 1.75 inches. Its capacity is approximately 37,000 pounds per hour with a normal expected capacity of approximately 33,000 pounds per hour. By use of a rather new flame impingement for the preheating chamber, the overall length of floor space requirement of this unit was held to a minimum. The furnace equipment proper includes a 5-foot charging extension, a flame impingement or preheat chamber, a conventional furnace chamber, a spray quench chamber and a 5-foot discharge extension. Major portion of the heating is performed in the preheat chamber, with the long conventional heating chamber being used to equalize and take care of the bar's final heating to the desired annealing temperature.

Two continuous spray pickling machines designed and built by Metalwash Machinery Corp., handle strip up to 29 inches wide at speeds up to 600 fpm. The scrubbing action of their high velocity sprays turns out brass strip having a much better appearance and surface condition than obtained by any other known method. The process eliminates the necessity of brushes, which are a constant source of maintenance trouble and expense.

Display Shows Manufacturing

ALL phases of a complex industrial manufacturing process are visualized in an animated and illuminated process-flow diagram exhibited by Brown Instruments Division of Minneapolis-Honeywell Regulator Co., Philadelphia, at the Exposition of Chemical Industries in New York. The instrument control board is described as a new step in industrial instrumentation for large plants, simplifying the operator's job by providing visual reminders of what is happening at each step in the process.

System is capable of making faster adjustments; actual operations can be visualized at a glance instead of having to travel long distances around the plant to get the same picture. Miniature towers and vessels connected by illuminated and colored piping simulate processing equipment. In addition to bringing an entire process within immediate view, the new development is said to simplify training of new operators and reduce costs by making possible use of smaller control houses.

Welding and Cutting Package

AVAILABLE as a packaged unit is the Flamecraft oxyacetylene welding and cutting outfit which includes oxygen and acetylene cylinders, welding torch, cutting attachment, tips, regulators, hose, goggles, cylinder truck, fluxes, an assortment of welding and hardfacing rods and an instruction folder.

Offered by Air Reduction Sales Co. of New York, the outfit includes cylinders of 60 cubic foot acetylene and 122 cubic foot oxygen types which were recently announced. Cylinders are supplied on a lease basis for a 25-year period, the estimated lifetime of the cylinders. Under this arrangement, demurrage charges are eliminated and maintenance of cylinders is guaranteed.

How to get UNIFORM quality in your stainless steel forgings

UNIFORM quality in your forgings has to start at the beginning —with the bars you use.

Timken® stainless steel forging bars give you high surface and internal quality that's *uniform* from bar to bar and from heat to heat. You can depend on uniform physical and chemical properties from shipment to shipment. Forgeability is consistent. Costs are cut through fewer rejects, delays and changes in shop practice.

Another big advantage of stainless steel forgings made from Timken forging bars is their uniform machinability—always fast, easy, with a smooth finish.

You can count on uniform quality in Timken stainless steel forging bars because quality is completely and rigidly controlled by The Timken Roller Bearing Company throughout manufacture.

For help with your problems, write our Technical Staff, leading authority on stainless steels. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, O. Cable address: "TIMROSCO".

50th birthday of the company whose products you know by the trade-mark: TIMKEN

TIMKEN

Fine Alloy

STEEL

and Seamless Tubes

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

UNIFORM ELECTROLYTIC

TIN PLATE COATS

. . . assured by new plating thickness meter

MORE uniformly coated electrolytic tin plate is reported to be obtained by using a new instrument developed at the research laboratory of Carnegie-Illinois Steel Corp., Pittsburgh. This meter, which continuously indicates and records tin coating thickness on steel strip during the plating operation, is now in regular use on all Ferrostan electrolytic tinning lines of United States Steel.

The new coating thickness meter operates entirely independently of other control instruments on the lines. Its function is to combine the electrical values of plating current, strip speed, strip width and plating efficiency in a precision circuit employing a self-balancing potentiometer to indicate and record thickness. For the convenience of the operator the instrument is calibrated in pounds per base box.

Dial Operated — Formerly, the weight of coating was tested by chemical means from sample sheets that were selected at intervals from the lines.

Now, when changing from one ordered thickness of coating to another, the operator is not required to read a battery of meters and refer the readings to a chart. Instead, he adjusts the plating control dials until the plating thickness meter indicates the specific coating weight. Since the instrument provides a continuous indication of coating weight, any variation in plating thickness is indicated at once.

Provision can be made for the instrument to operate an alarm when the coating weight deviates from the specified value. Also, if desired, the equipment may be set readily to control coating weight.

Reference potentials which actuate the meter are received from a tachometer generator, whose electrical output is directly proportional to the strip speed, and from a shunt or the equivalent in the plating-current bus, which provides a potential directly proportional to the total plating current. Thus potentials that are always proportional to strip speed and total plating current, respectively, are supplied to the meter continuously.

Since the quantity of tin deposited per unit area on the strip is a function of plating-current density, plating time and the efficiency of the plating bath, provisions were made to compensate for variations in these factors. Strip-width compensating potentiometer is calibrated to cover material 18 to 34 inches wide. Strip-width adjusting dial is calibrated in inches and can be set readily within plus or minus 1/16-inch.

Plating Efficiency Variations—Another potentiometer compensates for plating efficiency variations. Its indicating dial is calibrated in per cent and covers a range of 84 to 100 per cent plating efficiency. The potentiometers and all resistors are contained in a steel cabinet mounted above and attached to the plating thickness meter.

Following installation and calibration of the original plating thickness meter approximately 80 tests were made over a 10-day period of normal operation. These tests covered electrolytic tin plate production ranging from 0.25 to 0.75 pounds per base box. In each test chemical determinations of coating weight were compared with indications on the plating thickness meter. The meter was found to indicate coating weights as accurately as the chemical method. Application for patent on the meter has been filed.

Protects Tabulator Cards

PRODUCTION operation records may be protected, yet remain visible and readily accessible, with a holder of transparent Lumarith plastic, a product of Celanese Corp. of America, New York. The Preproven holder, as it is called by its manufacturer, R. B. Van Houten Co., Chatham, N. J., is said to eliminate problems brought about by soiled cards, smudged figures, ragged edges and creased or torn cards.

Reinforced folds reportedly enable the holder to take repeated rough treatment. The acetate plastic is able to withstand heat, humidity, impact and handling necessary to manufacturing processes. Each holder is able to keep up to eight cards, retaining flanges keeping them in position no matter how the holder is placed.

LETTERS
to the Editors

From Chile

I received your letter: Ref.: Important New Market Information on Steel Prices, and I am taking good note of your new market service, pointing out the latest "at mill" prices of iron and steel products as well as the closing market prices quoted by numerous companies, with the locations of their plants.

Being an important manufacturer of all kinds of tools, industry knives, etc., I am always interested in hearing about the latest developments in our line and realize that your magazine is of vital assistance in our Chilean steel market.

I would be very obliged, if you would let me know where I can get the new steel specification list of ASTM for the current year and for the last nine years.

Erique Block
Santiago, Chile

Steel specification lists are available from American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa.—The Editors

On Fundamentals

I have followed with interest your series of articles on the Fundamentals of Steelmaking. They are very informative and I have been able to use them in connection with my classes here at Ohio State University. I wonder if, when the series is complete, any form of bound pamphlet will be printed. Having only access to library copies I haven't been able to save the articles as they were published. Can you tell me how I may secure copies of these articles?

Albert B. Albrecht
228 N. High St.
Columbus, O.

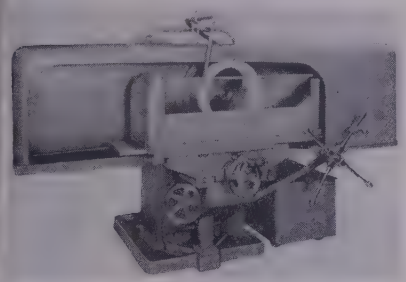
For some months you have been running a series of articles on "Fundamentals of Steelmaking". Perhaps you will eventually publish this series as a book or reprint. If it ever becomes available in this form I will appreciate your informing me the price of it. Such a series of articles by such well qualified authors is not a common occurrence.

Elmer H. Snyder
Chief Metallurgist
Austin-Western Co.
Aurora, Ill.

As each installment is completed in the regular issues of STEEL, it is reprinted for general distribution at cost. These reprints are available from STEEL's Readers' Service Department. Upon completion of the series, it will be published in book form. This will be late in 1950, however.—The Editors

Motorized Spindle Grinder

Mounted on three loaded bearings to insure long life and chatter-free operation, is the motorized spindle of a face grinder announced by Abrasive Machine Tool Co., East Providence 14, R. I. The 18-inch wheel mounted on the 900 rpm spindle, plus large work surface of 13 x 36 inches permits use of the machine for every



face grinding application wherever flat, square surfaces are required.

Box-type ways give maximum rigidity. Standard equipment includes complete coolant apparatus with 60 gallon tank and table water guards. Spindle has grease lubrication, while all other parts are oiled by a Bijur one-shot system. Elevating mechanism is completely enclosed for protection from work dust and coolant mist.

Check No. 1 on Reply Card for more Details

Cam Actuated Brake on Press

Offered with antifriction roller bearings on the flywheel and a cam actuated brake is the model 0 5-ton Press-Rite press, built by Sales Service Machine Tool Co., 2363 University Ave., St. Paul, Minn. A new type connecting rod and a nonrepeating safety mechanism are other features.

Frame of the press is of semisteel unicast construction for rigidity and strength. Press weighs about 300 pounds without motor.

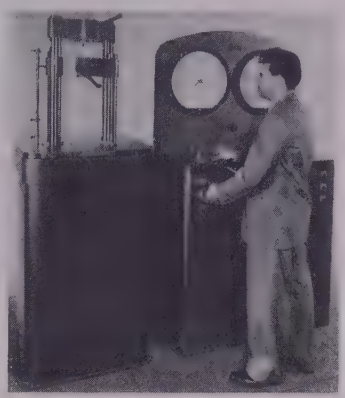
Check No. 2 on Reply Card for more Details

Two-Range Testing Machine

A 60,000-pound capacity in two ranges is designed into an improved universal testing machine announced by Baldwin Locomotive Works, Philadelphia 42, Pa. Designed with hydraulic loading units separate from indicating and control unit, recoil from the breaking specimens on the model 60-8 machine is isolated and maximum or lazy hands may be adjusted with minimum drag. Rigid two-column design gives high accessibility in handling specimens and simplifies observations.

Either tension or compression load is applied by an integrated piston and elevating cage consisting of the table, two uprights and upper gripping head, all of which have a 6-inch stroke. Lower gripping head is the upper member of a second adjustable cage including two long columns and lower crosshead, supported by a vertical screw extending downward from the closed end of the hydraulic cylinder.

Loading controls give infinitely variable speed between 0 and 2 inches per minute. Vertical distance between gripping heads may be 1 to 18 inches,



the latter including the stroke. The 60,000-pound range is graduated in 100-pound units on the indicator dial and the 12,000-pound range is graduated in 20-pound units.

Check No. 3 on Reply Card for more Details

Cleans Strip Continuously

Treatment in a powerful chemical solution, hot water and soap rinses and uniform drying by a cyanide degreasing installation made by W. S. Rockwell Co., 200 Eliot St., Fairfield, Conn., produces clean and bright light gage brass strip to 27 inches wide. Process is designed for continuous operation at speeds up to 250 feet per minute, with the metal strip in contact with the particular solution or drying atmosphere for the proper length of time to produce the desired surface finish.

Installation is 67 feet long and contains six individual sections, four of which are directly connected with the metal cleaning. A stitching operation joins the end of the strip to make a single continuous strip. Four rotating brushes in the first stainless steel tank, containing cyanide solution, help remove loosened grease and sediment from the strip surface. Temperature of solution is accurately controlled. A cold water spray unit removes all traces of cyanide prior to moving through a hot water washing tank and a soap tank, the final phase of the cleaning operation. Use of the last tank is optional.

Check No. 4 on Reply Card for more Details

Bends Thin-Wall Conduit

Hydraulic and remotely controlled, a thin-wall conduit bender developed by Blackhawk Mfg. Co., Milwaukee 1, Wis., bends 1¼, 1½ and 2-inch conduit sizes. Known as model S-54, it consists of a 10-ton, S-71 hydraulic unit and S-34 attachment assortment.

Remote control enables operator to work safely at a distance and sight bending progress. All-directional operation prevents air-binding in the bending unit and enables operator to use bending frame in a vertical, horizontal or elevated position. Hydraulic unit is detachable for use as a general use jack. An electrically driven hydraulic pump is available.

Check No. 5 on Reply Card for more Details

Prevents Scale in Furnaces

An atmosphere which prevents scale formation in soaking, normalizing, annealing, malleablizing, or heating for hardening, may be produced by a compact furnace accessory developed by Lithium Co., 111 Sylvan Ave., Newark 4, N. J. For attachment to any direct oil or gas-fired batch or continuous furnace, the atmosphere generator also prevents scale formation on the surface of the hot metal during subsequent hot

working operations. The lithium protection frequently provides lubricating characteristics valuable in hot working or cold drawing, reducing wear or dies and increasing effective service of forming rolls and tools between redressings.

Equipment is a refractory-lined steel chamber, heated by gas or electricity, through which runs the lithium vaporizer tube. Cartridge of lith-

1500-ton H-P-M FASTRAVERSE Press installed at Fairbanks, Morse & Co., cut steel wheel production cost.

From sheet stock to finished railroad wheels in only 3 operations! That's the record of the H-P-M 1500-ton FASTRAVERSE Press installed at Fairbanks, Morse & Co., Three Rivers, Michigan. These steel wheels for railroad work cars previously required 11 separate steps to complete. Their H-P-M Press reduced operations to 3! Look what else this H-P-M Press did for Fairbanks-Morse!

• Reduced man power requirements • Reduced production costs • Reduced maintenance costs • Reduced floor space.

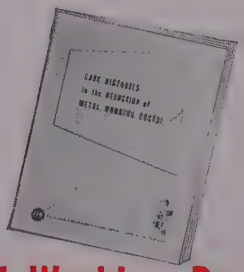
Look at H-P-M's production record on this extremely heavy stamping job.

• First operation—100 per hour • Second operation—129 per hour • Third operation—144 per hour.

All these advantages, *plus* the fact that Fairbanks-Morse has experienced no down time since the H-P-M Press was installed six years ago, clearly demonstrate the ability of H-P-M All-Hydraulic Presses to tackle *any* metal-working job . . . whether it's difficult or routine. H-P-M Presses will cut your costs, too. Write today.

THE HYDRAULIC PRESS MANUFACTURING CO.
1044 Marion Road • Mount Gilead, Ohio, U. S. A.

Write today for your free copy of "CASE HISTORIES in the REDUCTION of METAL WORKING COSTS". It tells how manufacturing costs are being reduced in many prominent production plants by H-P-M pressure processing.



All-Hydraulic Self-Contained **Metal Working Presses**

HPM

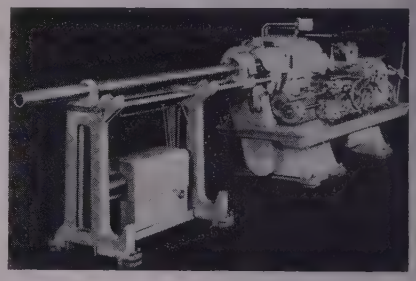
REVOLUTIONIZING PRODUCTION WITH HYDRAULICS SINCE 1877

ium compound is inserted into the tube and heated so that the carrier gas, which is also injected through the vaporizer tube, picks up the vaporized lithium and introduces it into the furnace chamber. As steel products are heated, the vapor unbalances the natural water-gas equilibrium reactions in such a manner as to place the new balanced ratios in equilibrium with the steel, thereby preventing oxidation.

Check No. 6 on Reply Card for more Details

Lathe Bar Feed, Collet Chuck

Bar feed and collet chuck mechanism made by Jones & Lamson Machine Co., 160 Clinton St., Springfield, Vt., for universal turret lathes, can be operated continuously at high-production rates without tiring the operator. The hydraulic mechanism



may be installed on any Jones & Lamson No. 3, 4, 5, 7 or 8 universal turret lathe, at the factory or in the field. With a single lever, finger tip control of the complete operating cycle, the operator is able to increase production with decreased effort.

Check No. 7 on Reply Card for more Details

Contour Saw—Band Filer

Time savings are realized in cutting, filing and file broaching on small production and maintenance parts, irregular shaped stacked parts and tools, templates and stampings, forming and trimming dies with the combination contour saw and band filer available from Boice-Crane Co., 1018 Central Ave., Toledo 6, O. An accurate scale eliminates guess work from angle filing. Speeds range from 92 to 4100 blade feed per minute for cutting all materials from steel to wood. A quick-change ball-bearing equipped gear box and step pulley makes any one of eight speeds instantly available.

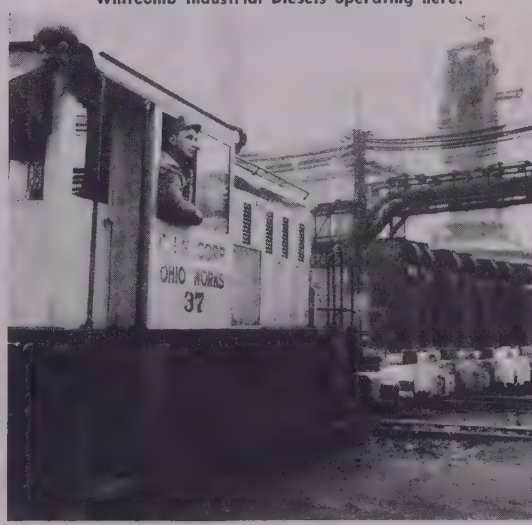
Frame is of 10-gage solid welded steel. The 15 x 15-inch heavy ribbed cast work table is mounted on two heavy cast trunnions. Independently hinged doors provide access for blade and band file installation and removal. Guides reduce blade costs on metal sawing and assure efficient op-

Fueling an 80-ton Diesel electric locomotive at an eastern steel plant. Fuel economy is an important advantage of Whitcomb Diesels, along with high availability, low maintenance costs.

Whitcomb 50-ton Diesel electric locomotive designed specifically for steel mill operations, one of six identical Whitcombs now in service at this leading steel plant.

At Scullin Steel, a 50-ton Whitcomb Diesel locomotive delivers inbound cars of scrap and materials to the 100-acre plant of Scullin Steel Company, St. Louis, Mo.

Whitcomb 35-ton Diesel electric locomotive, narrow gauge, in operation at the Ohio Works (Youngstown) of the Carnegie-Illinois Steel Corporation. One of four Whitcomb Industrial Diesels operating here.



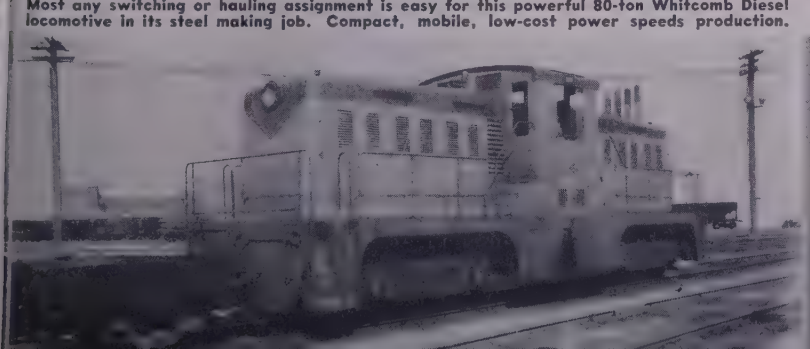
Whitcomb Industrial Diesels Tailor-Made For Steel Mills

Newest type Whitcomb Industrial Diesels include many special features designed to provide increased efficiency, easier operation, lowered hauling and switching costs.

Typical refinements include greater visibility through scientific window arrangement, a spacious, draft-free cab. Batteries are located at the sides for easy access and servicing. Bulk heads between engines and generators protect the latter from excessive engine heat. Safety step wells provide extra protection for switchmen.

As a first step toward cutting your haulage and switching costs, write today for complete information on the Whitcomb Industrial Diesel line — Diesel electrics from 25 to 95 tons; Diesel mechanicals from 8 to 30 tons.

Most any switching or hauling assignment is easy for this powerful 80-ton Whitcomb Diesel locomotive in its steel making job. Compact, mobile, low-cost power speeds production.



There is no power cheaper than Diesel; no locomotive finer than a Whitcomb.

THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILLINOIS

Subsidiary of

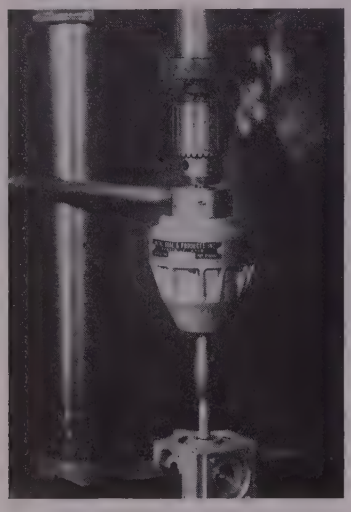
THE BALDWIN LOCOMOTIVE WORKS

eration of all blades 3/16 and ¾-inch wide. An automatic electric blade butt welder is included. Floor models include a steel cabinet stand which provides for a motor and gear box compartment.

Check No. 8 on Reply Card for more Details

Transmission Speeds Honing

Production is speeded and better finishes produced on standard honing and lapping machines with an augur movement transmission announced by Metal Seal & Products Inc., 21917 St. Clair Ave., Euclid 17, O. Also applicable for use on drill presses, screw machines and lathes, the transmission eliminates circumferential markings and reduces rejects be-



cause of surface flaws. Fixtures are recommended for workpiece holding and subsequent multiple operation. Flats, faces, cones, plugs and any diameter round hole can be finished.

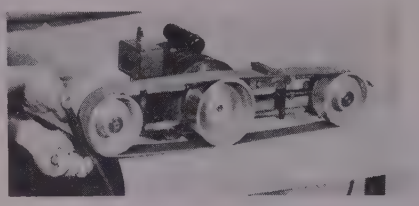
Transmission shown is utilizing a standard drill press as a power source to lap a three-way hydraulic selector valve. In operation the unit reduces a constant speed input to produce a quick reversing action that interrupts the rotation of output shaft every 45 degrees of travel. This action occurs 8 to 11 times in one revolution.

Check No. 9 on Reply Card for more Details

Grinds at Any Angle

H. L. Ramsay & Co., 636 S. 10th Ave., La Grange, Ill., is introducing the Expeditor belt grinder which can be set at any angle. It is mounted on an axis that centers at the motor shaft. One turn of a clamp nut sets the abrasive belt angle. Several machines may be set one above another so that the contact wheels or platens of them may be directly in front of the operator, enabling him to rough, semifinish and finish grind with little movement.

Used with milling machines, the grinder will deburr, remove cutter marks, break corners, etc., or with metal cutting band or hack saws it will clean up tooth marks and round out contours. It may be set up over a turn table or a moving belt with operations passing beneath to be reduced to proper size, rough ground and finish ground and polished, then

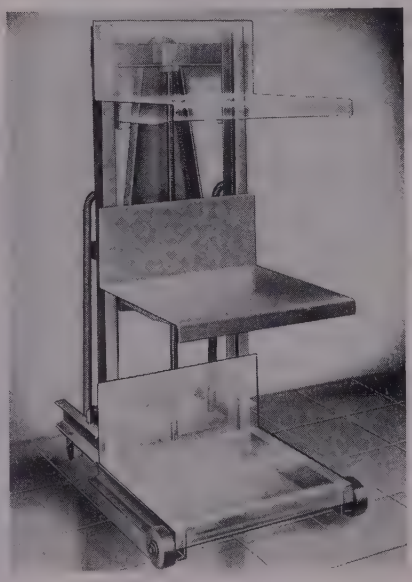


dropped out automatically. Front contact roll is made of aluminum, with a drive belt serving as a resilient cushion. Various densities are available.

Check No. 10 on Reply Card for more Details

Stacker Lifts 1000 Pounds

Maximum height of platform surface from floor is 58 inches and minimum is 6 inches on the Portelvator stacker unit of 1000-pound capacity, made by Hamilton Tool Co., Hanover at Ninth, Hamilton, O. Of fabricated construction, its platform automati-



cally locks at any position stopped and cannot slip or settle under the load.

Platform size is 26 inches from side to side and 24 inches from front edge to protective back plate. Platform movement is accomplished through hand crank, roller chain, meshing bevel gears and screw. Provision is made for rapid platform movement under light loads. Stacker is equipped with pressure grease fittings, ball bearing casters of 4-inch diameter and roller bearing wheels of 5-inch diameter. Rubber-tired wheels and casters may be furnished. A floor lock is standard equipment.

Check No. 11 on Reply Card for more Details

Press Has Deep Throat

An 18-inch throat which permits working to the center of 36-inch sheets is incorporated in the design of the 3-G Rousselle deep throat press, manufactured by Service Machine Co., 7627 S. Ashland Ave., Chicago 20, Ill. Standard bolster plate measures 14 x 20 inches; larger bolsters and punch holders may be furnished.

Frame is a heavy semisteel casting, heavily reinforced and designed so

that the bed protrudes, allowing clearance for certain jobs. Press is equipped with a single stroke or continuous clutch, roller bearing flywheel and extra long hardened and ground ways. It operates at a speed of 125 rpm and weighs about 3200 pounds.

Check No. 12 on Reply Card for more Details

Precipitation Transformer

Westinghouse Electric Corp., Pittsburgh 30, Pa., is announcing transformers for use as a source of high voltage in equipment for electrostatic precipitation of smoke, metals or other materials from gaseous mixtures. They are oil-insulated and hermetically sealed for long life and low maintenance. Lifting hooks are recessed into the tank and low-voltage bushings are set in a well in the top of the tank and hermetically sealed from the transformer itself.

Radio interference and corona are kept to low levels by high-voltage bushings treated at critical points with a semiconducting glaze. High strength against surges is obtained by shielding design of the core and

LUBRICATION DAN SEZ:

Your OPEN GEARS will never look this MESSY

* *with the new*

LEADOLENE

Klingfast

OPEN GEAR LUBRICANT

Certainly your open gears don't look this messy (but there are still hundreds of plants everywhere that do). But to be absolutely certain that you are getting the maximum efficiency and protection—get the complete facts from your BROOKS engineer. Without obligation he'll gladly go over the complete BROOKS story—at your convenience.

CHECK THESE 9 IMPORTANT FACTS:

1. **EXTREME PRESSURE pH-ilm STRENGTH** of 50,000 lbs. per square inch minimum by "Timken" testing machine.
2. **ADHESIVENESS** in which affinity for steel and other metals develops maximum adhesion and prevents drippage or creeping. Retains a flexible coating in nature.
3. **WATER REPELLENCE** which retards washing off, creates a lubricating pH-ilm under moisture or water conditions.
4. **CORROSION PREVENTION** is an excellent protective coating in that it will not etch or corrode metals. Is never acidic.
5. **COMPOUNDED STABILITY**—Will not bleed or change physical condition within range of higher than usual temperatures for this type of lubricant.
6. **LOW TEMPERATURE FACTORS**—While having a solidifying action by decreased temperature as low as —40 F., it does not harden, crack or decrease in adhesion. The flexible coating withstands distortion of the application.
7. **ABRASIVE RESISTANCE**—Extremely high for a lubricant. Does not wipe off nor will be removed in handling by workmen's hands or gloves. Is extremely repellent to adhesion of scale, metallics and other forms of dusts or contamination.
8. Klingfast has remarkable corrosive resistance to salt or sea water, acidic vapors and solutions.
9. Klingfast can be removed by ordinary solvents such as kerosene, gasolene, naphtha, carbontetrachloride and similar substances but is highly impervious to lubricating oils and greases.

"LEADOLENE . . . the "I. P. Lubricant" (Indestructible pH-ilm) . . . for Industrial Needs

The Brooks Oil Co. *Since 1876*

Pittsburgh 12, Pennsylvania
Cleveland, Ohio
Hamilton, Ontario

***Warehouses:* In Principal Industrial Cities**

coils and static plates and rings. No-load and total losses are reduced through use of type C Hipersil cores. Transformers are available in 5, 7½, 10, 15 and 25 kva sizes for 60,000 or 75,000-volt operation at 60 cycles.

Check No. 13 on Reply Card for more Details

Fork Truck Straddles Load

Pallet loads weighing up to 4000 pounds may be lifted and tiered with the power travel Worksaver straddle type electric fork truck, offered by Yale & Towne Mfg. Co., Philadelphia 15, Pa. Heavy bar steel frame members, equipped with tandem load wheels, hold these loads without deflection. Originally designed for use with wing-type pallets, this truck can also be equipped with permanent or removable steel plate platform and remote hoist control for use as a power-travel portable elevator or stacker.

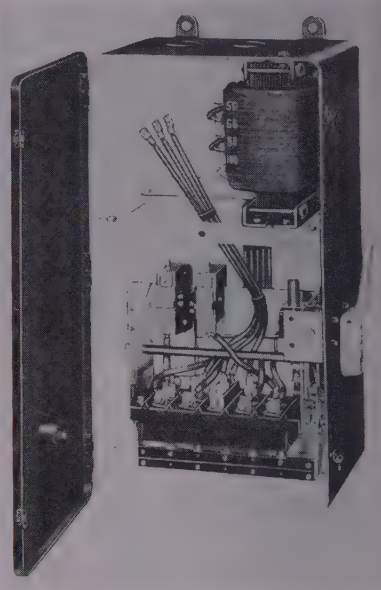
It has an articulating frame construction using two swivel wheels forward for stability and insuring traction through the power wheel drive on uneven floor surfaces. Truck is offered in 3000 and 4000 pound capacities in two models, one with overall height of 83 inches, fork elevation before telescopic lift of 61½ inches, and total lift 121½ inches. Second model has an overall height of 68 inches, fork elevation before telescopic lift of 46½ inches and a total lift of 91½ inches. Overall length is 82 inches with 42-inch forks.

Check No. 14 on Reply Card for more Details

Manual Starter in Four Sizes

Available in four sizes from 5 hp, 220-440-550 v to 250 hp, 440-550 v, for 25, 50 and 60 cycles is a manual autotransformer-type starter for squirrel-cage induction motors, offered by Allen-Bradley Co., Milwaukee, Wis. Switch mechanism operates with a quick-make, quick-break action. Two automatic reset overload relays are standard equipment.

Line comes in two forms: Form T, with air-break contacts and form X with oil-immersed contacts. Con-

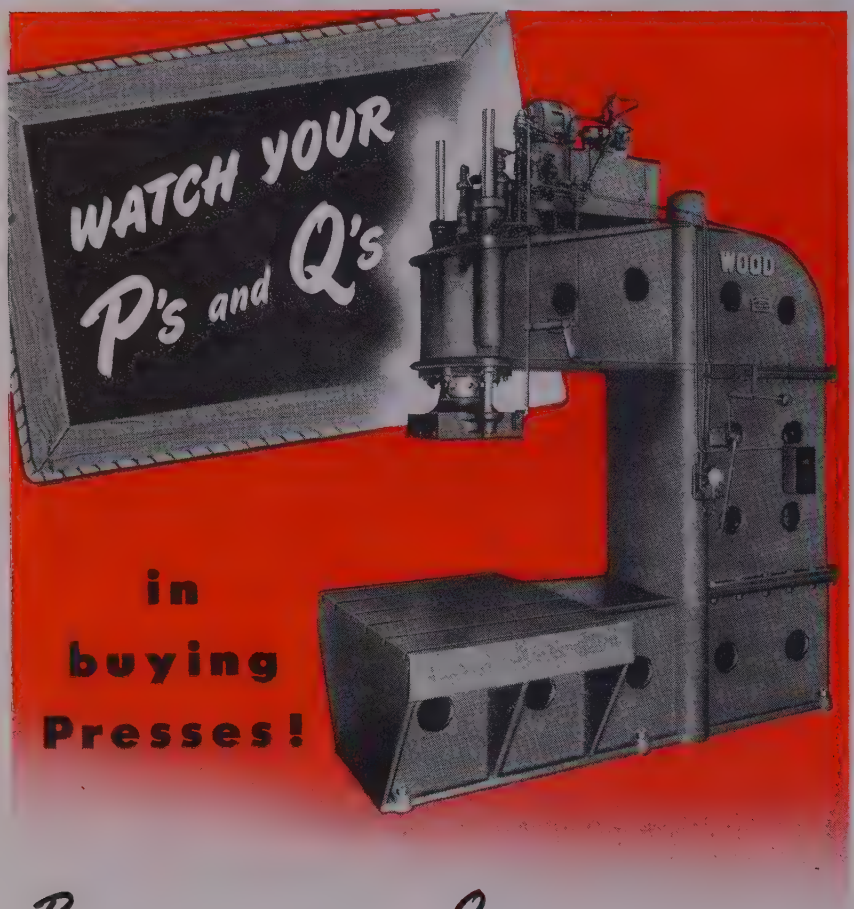


version to oil-immersed operation requires no changes in the switch other than the addition of an oil tank. A time-delay under-voltage release, which prevents unnecessary opening of the switching mechanism on slight voltage dips, is standard on the largest size. All have an adjustable time-delay mechanism for controlling length of accelerating period before switching the motor from starting to running taps.

Check No. 15 on Reply Card for more Details

• • •

PROVIDES REGULATION: ML-8 step-type branch line voltage regulator, offered by General Electric Co.'s Transformer and Allied Products Division, Schenectady 5, N. Y., pro-



PROOF:

You want proof that the press you buy will give you maximum quality production with maximum economy. Take the R. D. Wood 250-ton Hydro-Lectric Open-Gap Press shown, for example. Used in flanging, bending, or straightening operations, this press has proved itself in countless plants throughout the country. It does a quality job, keeps operating and maintenance costs at a minimum.

Q. E. D.:

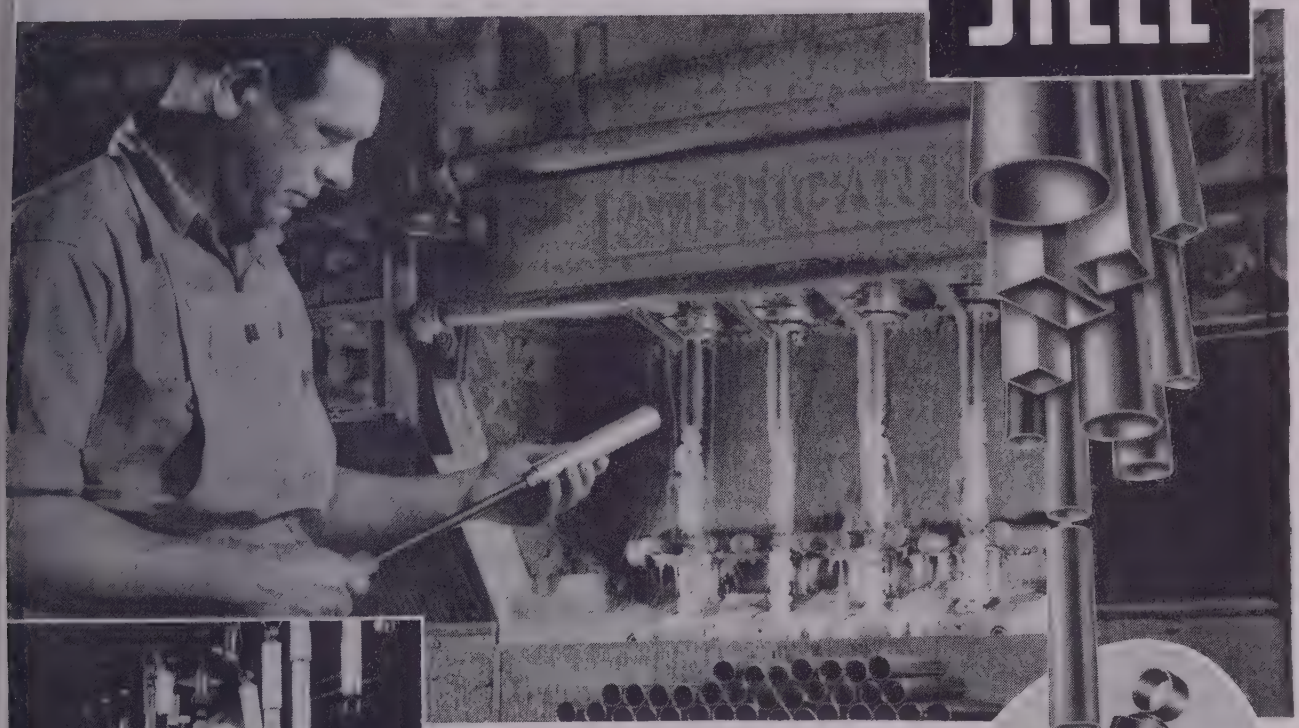
You want a press that demonstrates its worth to you. You'll find such worth inherent in R. D. Wood Presses. In the design, materials, and workmanship which go into the R. D. Wood Press line lies your assurance of demonstrable production and economy. Write now for data on hydraulic presses or hydraulic press problems. R. D. Wood Company, Public Ledger Building, Phila. 5, Pa.

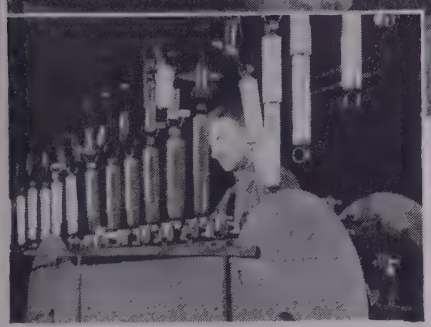
HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

EST. 1803 R. D. Wood Company PUBLIC LEDGER BUILDING PHILADELPHIA 5, PA.

Houdaille-Hershey makes better shock absorbers *at lower cost* with J&L free-machining ELECTRICWELD STEEL TUBING

J&L STEEL





(*Above*) Multiple spindle broaching machine at the Houde Engineering Division of Houdaille-Hershey Corporation that machines the inside diameter of J&L ELECTRICWELD Tubing to 1/1000" tolerance.

(*Left*) Aeroplane-type shock absorbers on the production line at the Houde Engineering Division, Houdaille-Hershey Corporation, Buffalo, N. Y.

When production runs into thousands of units daily, every possible saving in material and labor costs in each shock absorber is vital to efficient manufacturing. Houdaille-Hershey Corporation, Buffalo, New York, reduced manufacturing costs when it changed from more expensive cold-drawn tubing to J&L *free-machining* ELECTRICWELD Tubing for the main cylinder of precision-built hydraulic shock absorbers.

This special J&L tubing is made from *resulphurized, open-hearth steel.* The resulphurizing imparts the desired free-machining quality required by Houdaille-Hershey for broaching the interior surface of the cylinders with uniform precision to a tolerance of 1/1000 of an inch.

Because J&L controls every step in the manufacture of ELECTRICWELD Tubing from raw materials to finished product, it can give you the exact grade of steel you need to help you make a better product, faster, and at a lower cost.

If you use tubing in the manufacture of your product investigate J&L ELECTRICWELD Tubing. Write today for your copy of our new booklet: "J&L ELECTRICWELD TUBING *for more strength with less weight.*"

Jones & Laughlin Steel Corporation
404 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me your booklet: "J&L ELECTRICWELD TUBING *for more strength with less weight.*"

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

vides a total of 10 per cent regulation in eight 1¼ per cent steps in the following combinations: 10 per cent raise, 7½ per cent raise to 2½ per cent lower, 5 per cent raise to 5 per cent lower, 2½ per cent raise to 7½ per cent lower or 10 per cent lower.

Check No. 16 on Reply Card for more Details

COUPLING WITH TAPER BUSHINGS: Designed to accommodate any shaft from ¾-inch to 1¾-inch diameter, in $\frac{1}{16}$-inch increments, with standard keys is the new Rawson clutch coupling offered by Centric Clutch Co., Cranford, N. J. Complete packaged units ready for use with motors from 0.43 hp at 580 rpm to 25.7 hp at 1800 rpm are available.

Check No. 17 on Reply Card for more Details

PROTECTS MATERIALS: A metal corner protector for use at aisle corners to prevent damage to materials and as a guide for truck operators, is announced by Economy Equipment Co., Cleveland 3, O. It is made of heavy gage steel, stands 30 inches high with 12-inch wide sides. Corner is held firm by square metal base which slides beneath the pallet, skid, box, etc.

Check No. 18 on Reply Card for more Details

FOR SURFACE GRINDERS: Omer E. Robbins Co., Detroit 7, Mich., announces the 20-inch series of Magna-Sines designed for use on production-type surface grinders. It has a permanent magnet chuck measuring 7½ inches deep by 20½ inches long and can be used for either wet or dry grinding.

Check No. 19 on Reply Card for more Details

SWEEPS AND COLLECTS WASTE: Series 800 sweeper, offered by Wilshire Power Sweeper Co., Los Angeles, Calif., is designed for both indoor and outdoor maintenance. Unit collects waste and sweeps ground or floor in one easy motion. Adaptable to all types of sweeping jobs, the sweeper has plenty of power to keep floors free of sand, nails, shavings, bolts, nuts or welding rod butts.

Check No. 20 on Reply Card for more Details

FOR BRIGHTENERS: For shipment of nickel brighteners, a new stainless steel barrel is introduced by Udylite Corp., Detroit 26, Mich. Barrels eliminate breakage and can be stacked one on top of the other. They have a capacity of 15 gallons.

Check No. 21 on Reply Card for more Details

MEASURES GAS FLOW RATES: Known as the Floguide, a new variable area gas flowmeter has been developed by Fischer & Porter Co., Hatboro, Pa., for the measurement of gas flow rates. Its metering elements are made of corrosion-resistant stainless steel. It is available in capacities ranging from 45 to 16,000 standard cubic feet of carbon dioxide per hour, 200 to 76,000 standard cubic feet of hydrogen per hour and comparable capacities for other gases.

Check No. 22 on Reply Card for more Details

BURNISHING COMPOUND: Development of a new burnishing compound called Burnish-All is announced by Chemclean Products Corp., New York 13, N. Y. It is an all-around composition that can be used on a variety of metals.

Check No. 23 on Reply Card for more Details

PROTECTION AGAINST DUST: A new lightweight helmet for protection against heavy concentrations of dust and abrasives in sand blasting operations has been developed by Willson Products Inc., Reading, Pa. Air is supplied to the wearer through a perforated tube at top of helmet.

Check No. 24 on Reply Card for more Details

MEASURES THICKNESSES: Krouse Testing Machine Co., Columbus 3, O., announces a new magnifying micrometer that is used for thickness measurements of plating, paint and enamels. It measures the force necessary to overcome magnetic attraction between the precision formed permanent magnet in the instrument and the magnetic base material, the magnetic coating or their combination.

Check No. 25 on Reply Card for more Details

BLOCK HAS SHORTER LENGTHS: Lo-Head crane block, introduced by American Hoist & Derrick Co., St. Paul 1, Minn., in capacities from 10 to 50 tons, is available for all types of hook work. With its shorter overall length, the block permits 1½ to 2-foot higher lifts without lengthening the boom.

Check No. 26 on Reply Card for more Details

AIR CONTROL VALVES: Ross Operating Valve Co., Detroit 3, Mich., offers a quick-operating, solenoid valve for industrial use. It is ⅛-inch pipe size, straightway or three-way, with in-line, side, bottom or panel mountings and is available in both normally open and normally closed models.

Check No. 27 on Reply Card for more Details

FOR MIXING OPERATIONS: A versatile new portable mixing motor, for a wide range of mixing, emulsifying or stirring operations in industrial plants, is announced by Aro Equipment Corp., Bryan, O. The air-powered tool has a fully adjustable mounting clamp, easy needle valve adjustment for complete speed control and motors are explosionproof. Motors may be selected with speeds of 500, 1200, 2800, 4500 and 17,000 rpm.

Check No. 28 on Reply Card for more Details

MOISTURE-PROOF METAL PRIMER: Thomson-Porcelite Paint Co., Philadelphia 6, Pa., offers Led-Chroxide, a multipurpose, moisture-proof, metal primer that is a balanced blend of red lead, zinc chromate and iron oxide in combination with a vehicle developed by the company that brings out best characteristics of each of the rust-inhibiting pigments.

Check No. 29 on Reply Card for more Details

HEATS OIL AND WATER SOLUTIONS: A new portable tank immersion heater for heating oil and water solutions, tar, paraffin, glue, solvent cleaners and similar compounds is announced by Edwin L. Wiegand Co., Pittsburgh 8, Pa. Heaters are rated from 2 to 18 kw, 115 or 550 v, single or 3-phase. Copper, steel, Inconel or stainless steel sheath is available.

Check No. 30 on Reply Card for more Details

PROVIDES WIDE LATITUDES: A new dividing head that provides wide latitude in selecting various divisions to meet specific requirements is offered by Marvin Machine Products Inc., Detroit 26, Mich. Unit comes complete with three index plates, each plate having six sets of holes. It will tilt from 5 degrees below horizontal axis to 30 degrees past vertical axis.

Check No. 31 on Reply Card for more Details

ECONOMY IN WELDING: Electro-Mizer, made by Hobart Brothers Co., Troy, O., is a remote start-stop switch, mounted on a stand, with arms providing finger-touch control. Weight of electrode holder breaks circuit and shuts off the welding machine. When electrode holder is hung up, it automatically shuts off the machine and when the holder is picked up, it automatically starts the machine.

Check No. 32 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Helpful Literature

...Custom-Cut Gears

Perkins Machine & Gear Co.—4-...ge illustrated folder on custom-cut ...etallic or nonmetallic gears presents ...pical applications that include ...ashing and ironing machines, air-...aft engines and accessories, ma-...ine tools, precision instruments, ...al stokers, hoists and pumps.

...5. Stainless Steel

Allegheny Ludlum Steel Corp.—36-...age illustrated brochure "Allegheny ...letal in the Food-Processing Indus-...y" shows and depicts installations ...mploying stainless steel in wide va-...iety of food processing plants. Tech-...ology, available forms and fabrica-...ion of stainless steel are covered as ...ell as corrosion resistance to vari-...us media.

...6. Free Water Knockouts

Black, Sivalls & Bryson, Inc.—12-...age illustrated catalog 54, section ..., part 4 explains use and features of ...ree water knockouts for use with oil ...processing equipment. These vertical ...vessels mounted on short skirts re-...move free water before emulsion ...reaches treater.

77. Gasoline Fork Trucks

Yale & Towne Mfg. Co.—4-page illustrated bulletin No. P1170 gives instructions on how to operate gasoline fork trucks safely and with minimum wear to moving parts. Total of 25 hints are given along with pertinent small drawings to emphasize facts presented.

78. Injection Molding

Tennessee Eastman Corp.—55-page illustrated third edition of "Tenite Injection Molding" is guide to injection molding of Tenite I and Tenite II cellulose acetate and cellulose acetate butyrate thermoplastics. Book contains data on choice of material, proper product design, injection molding machines, mold design and construction, and various finishing operations.

79. Heat Processing Machines

Selas Corp. of America—8-page illustrated bulletin S-6.1 is entitled "Heat Processing Machines for Forging and Bending." It discusses radiant gas heating rates of from 1 to 5 minutes per thickness inch of steel and consequent metallurgical advantages of fast metal flow and minimum scale formation.

80. Intercommunication Unit

Executone, Inc.—4-page illustrated form No. 290 outlines manufacturer's line of intercommunication equipment that includes Chime-Matic unit which signals by means of mellow chime and signal light. Described also are streamlined life-time cabinets and full-trunkage switching for many types of communication equipment.

81. Hydraulic Presses

Dorr-Patterson Engineering Co.—4-page illustrated bulletin No. 41 shows numerous examples of column type, vertical open gap, straightening, horizontal and horning presses and hydrostatic tube testing equipment.

82. Bench Shaper

South Bend Lathe Works—4-page illustrated bulletin No. 500 presents description, specifications and price of 7-in. bench shaper designed for rapid machining of small parts. Welded steel three-drawer stand, motors and tools are covered also.

83. Tank Heating & Cooling

Kold-Hold Mfg. Co.—6-page illustrated circular outlines features of Platecoil tank heating and cooling equipment. Comparison is made between Platecoil and pipe coil methods of heat exchange.

84. Loading Dock Lifts

Wayne Pump Co.—4-page illustrated forms 818-R, 826 and 822 describe tilting loading dock lifts and ramps. Hydraulic units are powered by air or electric pumping unit and have standard capacity of 20,000 lb.

85. Optical Comparator Charts

Jones & Lamson Machine Co.—20-page illustrated catalog form No. 49-471-7500 presents complete data on radius, grid, protractor, screw thread, standard inspection, and blank drawing charts for use with company's optical comparators; chart rails; glass scales and combination holder.

86. Pipe & Tubing

Michigan Pipe Co.—4-page illustrated folder "MPC" lists applications of wood stave, wood lined and Saran rubber lined pipe and stainless steel and Monel metal tubing. Suitability of these five types for conveying various chemical products is tabulated.

87. Rotary Pumps

De Laval Steam Turbine Co.—4-page illustrated catalog LG shows cut-away drawings of six different types of IMO rotary pumps, along with brief description of each. Particularly suited to oil burner, pressure lubrication and hydraulic pressure services, pumps are available in capacities from ½ to 1000 gpm for pressures to 500 psi and capacities to 150 gpm for pressures to 1500 psi.

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88. Industrial Heating Units

Prat-Daniel Corp., Thermobloc Div. —Illustrated data file No. 901 contains complete catalog descriptions of Thermobloc self-contained direct-fired industrial heating units of 300,000 and 550,000 Btu per hour output. Also available is series of data sheets that show how these heaters can be used for tempering make-up air, process heating and other special applications.

89. Fluid Drives

Link-Belt Co.—28-page illustrated engineering data book No. 2385 covers types, arrangements and dimensions of fluid drive units available in sizes up to 30 hp. Models described include motorized type ED, gear-motor type EG, and FD and FG units which have input shafts in place of integral motors.

90. Jobbing Work

Hardinge Co., Hardinge Mfg. Div. —12-page illustrated brochure No. AS-400 depicts facilities of plant for handling various types of patterns, castings, machine work and plate steel as well as numerous examples of custom-built machinery. Jobbing is handled in addition to regular line of grinding mills, rotary dryers, classifiers and similar equipment.

91. Specialized Lubricants

Keystone Lubricating Co.—30-page illustrated application guide form No. C 10L presenting line of specialized lubricants for industrial and automotive machinery gives recommendations for lubricating all types of bearings under various operating conditions. Also included are suggestions for lubrication of pump glands, valves and other equipment subjected to contact with acids, alkalies and moisture.

92. Stainless Steel Tubing

Carpenter Steel Co., Alloy Tube Div.—12-page illustrated brochure "Carpenter Stainless Tubing" gives sizes, tolerances and permissible gage variations of complete stock of stainless steel tubing. Charted are heat resistance, theoretical bursting pressures and physical properties. Data are included on annealing and pickling and various other processing and testing methods.

93. Clutch & Brake Unit

Clearing Machine Corp.—4-page illustrated bulletin No. 213 is descriptive of Tornadyne clutch and brake unit which has small mass of parts that start and stop with every press stroke. This results in both power saving and speed of response.

94. Powder Metallurgy

F. J. Stokes Machine Co.—40-page illustrated brochure "Powder Metallurgy Today" is brief summary of this field. Sections deal with how parts are made, general and special applications, mechanical characteristics and design of parts, and typical products now being made of powder metal.

95. Surface Coatings

American Cyanamid Co.—Illustrated guide to complete line of resins for use in surface coatings and printing is devoted to tabulating physical and chemical properties of various coatings available. These include Rezyl alkyd, Melmac melamine, Beetle urea, Cycopol copolymer, Phenac phenol and Teglac dibasic-acid modified resins.

96. Flexible Shafting

Elliott Mfg. Co.—4-page illustrated folder "Elliott Flexible Shafting" presents details on power drive and remote control types of flexible shafting; discusses typical shafting assemblies; and describes flexible shaft couplings, push-pull controls and monocoil casings formed of helically wound wire.

97. Sleeve Bearings

Johnson Bronze Co.—Vertical file and enclosed illustrated data sheets comprise part of series which provides information on sheet metal, ordinary sleeve and graphited bronze bearings. Included are such topics as how to select proper alloy, lubrication of various types, powder metallurgy for bearings and parts, and clearances.

98. Recloser

Westinghouse Electric Corp.—4-page illustrated bulletin B-4339 explains operation of 100-amp type GR recloser with aid of diagrams and semipictorial drawings. Table shows minimum tripping currents for five coil sizes available and maximum interrupting capacities at common operating voltages.

99. Proportioning Oil Burner

Hauck Mfg. Co.—24-page illustrated catalog No. 410 deals with proportioning oil burner for accurate control of furnace temperature and atmosphere during heat processing operations. Unit features single control lever, uniformity of oil-air ratios and flame character from all burners on one furnace, and operation on heavy or light oils.

100. Crane Block

American Hoist & Derrick Co.—4-page illustrated catalog No. 300-16 describes Lo-Head crane blocks designed for maximum headroom and available in capacities from 10 to 50 tons with one, two or three sheaves ranging in diameter from 18 to 24 in.

FOR MORE INFORMATION USE ONE OF THESE CARDS . .

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11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20	40	60	80	100

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Market Summary

BROAD industry-wide upward adjustment in steel prices now is accepted as a foregone conclusion. Action of U. S. Steel Corp. subsidiaries last week, increasing price schedules an average of $4 per ton, including base prices and extras, set the pace for the trade generally. Other producers are expected to follow once they have had time to analyze the corporation's new price lists. Some deviations are possible, but in the main the larger independent steelmakers are believed likely to establish their quotations on a competitive basis. U. S. Steel's revisions were on a selective basis, averaging $2 on base prices and $2 on extras, actual increases varying among the products. In the case of tin plate and skelp, reductions were effected. Independent producers are thought likely to follow the same pattern.

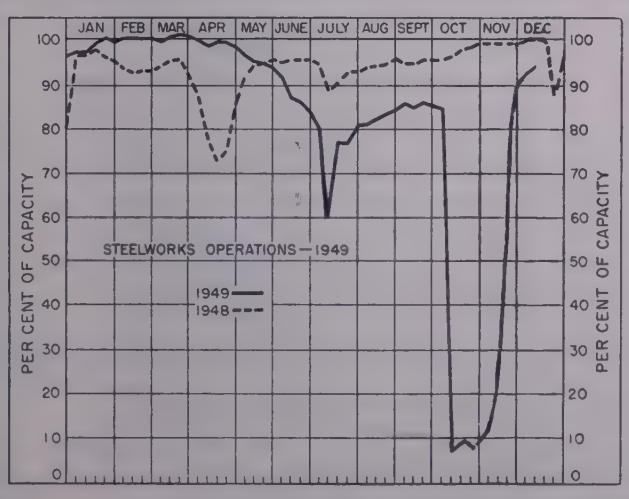
EFFECT—The higher price schedules are not believed likely to have any immediate effect on demand. Unshipped tonnage on mill books will take the new prices since contracts stipulate prices in effect at time of delivery. The new U. S. Steel lists became effective Dec. 16. Consumers received the news with equanimity but repercussions were heard in Washington where a congressional investigation is threatened. Buyers had been alerted for weeks of a coming advance and view the increases as moderate considering the sharp rise in steel labor and other costs, especially pension and welfare charges. The increases in extras had been under consideration for months, a fact well known to the consuming trade. Over the past month or so at least ten smaller steelmakers have raised prices on various products, $5 to $35 per ton.

COMPOSITES—Since the U. S. Steel Corp.'s revisions were effective Dec. 16, STEEL's weighted index, computed as of Dec. 15, holds unchanged at 152.52. The arithmetical price composite on finished steel also held at $91.64 and compared with $95.50 a year ago. Scrap continued weak, the steelmaking grade composite easing to $28.25 from $28.58. Pig iron composites held steady as follows: Basic, $45.60; No. 2 foundry, $46.10; malleable, $47.27.

DEMAND—Active movement of steel into consumption throughout first quarter is assured by heavy mill order backlogs as yearend nears. Outlook for second quarter is less clear. Some uncertainty as to demand after March is noted. Generally, the steelmakers anticipate large volume business through midyear, contingent upon developments in the automotive, construction and other large steel consuming industries. Currently, holiday and seasonal influences are restricting activities in some metalworking lines, this being particularly reflected in the moderate volume of new business being done in the steel warehouse trade.

SHEET SUPPLY—Mill order backlogs are unusually heavy in flat-rolled products. Producers are booked solidly through first quarter, a few into June. Some first quarter tonnage will be carryover from 1949 with certain mills weeks behind on deliveries. With demand for consumer goods continuing active, pressure for sheet tonnage is unabated. So urgent is demand, conversion deals are becoming more prevalent, although buyers are not inclined to extend these beyond first quarter. They expect the pinch in supply to be relaxed by that time.

OTHER PRODUCTS—In various wire items acute supply conditions are indicated through first quarter. Certain grades of pipe will continue tight for months. In other products supply is less acute with consumer pressure for shipments noticeably less pronounced than in sheets, wire and pipe. Users' stocks of plates, shapes and bars are reported in better balance and producers of these products can accept business for early first quarter shipment. In plates, business in the heavier gages is being accepted for shipment within two weeks.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Dec. 17	Change	Same Week 1948	Same Week 1947
Pittsburgh	94	+ 2*	96	101.5
Chicago	95.5	— 1*	98	94
Eastern Pa.	83	None	97	93.5
Youngstown	95	None	105	102
Wheeling	99	None	94.5	93.5
Cleveland	103	+ 3*	96.5	91
Buffalo	103.5	None	104	88.5
Birmingham	100	None	100	102
New England	85	— 4	89	85
Cincinnati	104	+ 3	99	89
St. Louis	89.5	— 2	89.5	89.5
Detroit	101	None	103	94
Western	91	+ 2	..	..
Estimated national rate	94.5	+ 1.5	99.5	97.5

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Change from revised rate.

Composite Market Averages

	Dec. 15 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	152.52	152.52	152.52	151.86	99.16
Index in cents per lb	4.132	4.132	4.132	4.114	2.686
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$91.64	$91.64	$91.64	$95.50	$56.73
No. 2 Fdry Pig Iron, GT	46.10	46.10	46.10	46.69	23.67
Malleable Pig Iron, GT	47.27	47.27	47.27	47.41	24.29
Basic Pig Iron, GT	45.60	45.60	45.60	46.29	23.00
Steelmaking Scrap, GT	28.25	28.58	30.00	43.25	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Dec. 15 1949	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.35	3.35	3.35	3.35-55	2.15
Bars, H.R., del. Phila.	3.83	3.83	3.83	3.79	2.47
Bars, H.R., Chicago	3.35	3.35	3.35	3.35	2.15
Bars, C. F., Pittsburgh	3.95-4.00	3.95-4.00	3.95-4.00	3.95-4.25	2.65
Bars, C. F., Chicago	4.00	4.00	4.00	4.00	2.65
Shapes, Std., Pittsburgh	3.25	3.25	3.25	3.25-30	2.10
Shapes, Std., Chicago	3.25	3.25	3.25	3.25	2.10
Shapes, del. Phila.	3.50	3.50	3.50	3.48	2.215
Plates, Pittsburgh	3.40	3.40	3.40	3.40-60	2.10
Plates, Chicago	3.40	3.40	3.40	3.40	2.10
Plates, Coatesville, Pa.	3.50	3.50	3.50	3.75	2.10
Plates, Sparrows Point, Md.	3.40	3.40	3.40	3.45	2.10
Plates, Claymont, Del.	3.50	3.50	3.50	3.95	2.10
Plates, del. Phila.	3.59	3.59	3.59	3.71	2.15
Sheets, H.R., Pittsburgh	3.25	3.25	3.25	3.25-30	2.10
Sheets, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Sheets, C.R., Pittsburgh	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Chicago	4.00	4.00	4.00	4.00	3.05
Sheets, C.R., Detroit	4.20	4.20	4.20	4.20	3.15
Sheets, Galv., Pittsburgh	4.40	4.40	4.40	4.40	3.50
Strip, H.R., Pittsburgh	3.25	3.25	3.25	3.25-70	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25-30	2.10
Strip, C.R., Pittsburgh	4.00	4.00	4.00	4.00-75	2.80
Strip, C.R., Chicago	4.00-15	4.00-15	4.00-15	4.00-25	2.90
Strip, C.R., Detroit	4.20-25	4.20-25	4.20-25	4.20-50	2.90
Wire, Basic, Pittsburgh	4.15	4.15	4.15	4.15-4.50	2.60
Nails, Wire, Pittsburgh	5.15	5.15	5.15	5.15-6.30	2.55
Tin plate, box, Pittsburgh	$7.75	$7.75	$7.75	$6.80	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$61.00	$61.00	$61.00	$61.00	$40.00
Sheet bar, mill(NT)	51.78–57.00	51.78–57.00	51.78–52.00	67.00	34.00
Wire rods, ½-⅝", Pitts.	3.40	3.40	3.40	3.40-4.15	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$47.00	$24.50
Basic, Valley	46.00	46.00	46.00	46.00	23.50
Basic, del. Phila.	49.44	49.44	49.44	50.17	25.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.00-46.50	24.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	24.00
No. 2 Fdry, del. Phila.	49.94	49.94	49.94	50.67	25.84
No. 2 Fdry, Birmingham	39.38	39.38	39.38	43.38	20.38
No. 2 Fdry.(Birm.)del Cin.	46.08	46.08	46.08	49.09	24.06
Malleable, Valley	46.50	46.50	46.50	46.50	24.00
Malleable, Chicago	46.50	46.50	46.50	46.50	24.00
Charcoal, Lyles, Tenn.	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts.	$31.00	$32.00	$33.00	$42.75	$20.00
No. 1 Heavy Melt. E. Pa.	24.75	24.75	26.50	45.25	18.00
No. 1 Heavy Melt. Chicago	29.00	29.00	30.50	41.75	18.75
No. 1 Heavy Melt. Valley	31.75	32.75	32.75	42.75	18.25
No. 1 Heavy Melt. Cleve.	29.75	30.25	30.25	42.25	18.25
No. 1 Heavy Melt. Buffalo	29.75	29.75	29.75	48.50	19.25
Rails, Rerolling, Chicago	43.50	43.50	44.50	69.50	22.25
No. 1 Cast, Chicago	42.50	42.50	42.50	70.50	20.00

COKE, Gross Ton

Beehive, Furn., Connlsvl.	$13.25	$13.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl.	15.50	15.75	15.75	17.00	7.75
Oven Fdry, Chicago	20.00	20.00	20.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	23.50	12.00
Zinc, E. St. Louis	9.75	9.75	9.75	17.50	8.25
Lead, St. Louis	11.80	11.80	12.55	21.30–35	6.35
Tin, New York	78.75	79.00	92.50	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex.	32.00	32.00	32.00	38.50	14.50
Nickel, refinery, duty paid	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham,Ala. R2, S9	38.88	39.38	....	....
Woodward,Ala. W15	38.88	39.38	....	....
Cincinnati,del.	....	46.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y. W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y. T9	....	46.50	47.00	....
Boston,del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
So.Chicago,Ill. Y1	46.00	46.50	46.50	....
Milwaukee,del.	47.89	48.39	48.39	48.89
Muskegon,Mich,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del.	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del.(incl. tax)	48.65	49.15	49.65	....
Ironton,Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts.N.&S. sides,Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville,O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y. R2	48.00	48.50	49.00	....
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O.,del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; Add $1 for each 0.5% Si to 11.50%)

Jackson,O. J1, G2	$50.50
Buffalo H1	60.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk,Iowa, OH & Fdry., 12½ lb, piglets, frt. allowed K2	82.00
Wenatchee,Wash, OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles,Tenn. T3	$60.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.89
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Dec. 15, 1949; cents per pound unless otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

Prices quoted are those in effect prior to revisions by U. S. Steel Corp. subsidiaries, effective Dec. 16. Turn to Pages 45 and 132 for new price schedules.

INGOTS, Carbon, Forging (NT)

Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)

Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 ... 51.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bessemer,Pa. C3 ..... $52.00
Clairton,Pa. C3 ..... 52.00
Conshohocken,Pa. A3 .. 57.00
Ensley,Ala. T2 ..... 52.00
Fairfield,Ala. T2 ..... 52.00
Fontana,Calif. K1 ..... 71.00
Gary,Ind. C3 ..... 52.00
Johnstown,Pa. B2 ..... 52.00
Lackawanna,N.Y. B2 .. 52.00
Munhall,Pa. C3 ..... 52.00
Sharon,Pa. S3 ..... 57.00
So.Chicago,Ill. C3 .... 52.00
So.Duquesne,Pa. C3 ... 52.00

Carbon, Forging (NT)

Bessemer,Pa. C3 ..... $61.00
Buffalo R2 ..... 61.00
Canton,O. R2 ..... 61.00
Clairton,Pa. C3 ..... 61.00
Cleveland R2 ..... 61.00
Conshohocken,Pa. A3 .. 63.00
Detroit R7 ..... 61.00
Ensley,Ala. T2 ..... 61.00
Fairfield,Ala. T2 ..... 61.00
Fontana,Calif. K1 ..... 80.00
Gary,Ind. C3 ..... 61.00
Geneva,Utah G1 ..... 61.00
Houston,Tex. S5 ..... 69.00
Ind. Harbor,Ind. I-2 ... 61.00
Johnstown,Pa. B2 .... 61.00
Lackawanna,N.Y. B2 .. 61.00
Munhall,Pa. C3 ..... 61.00
So. Duquesne,Pa. C3 ... 61.00
So.Chicago,Ill. C3, R2.. 61.00
Warren,O. C17 ..... 61.00

Alloy (NT)

Bethlehem,Pa. B2 .... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2, T7..... 63.00
Conshohocken,Pa. A3 .. 65.00
Detroit R7 ..... 63.00
Fontana,Calif. K1 .... 82.00
Gary,Ind. C3 ..... 63.00
Houston,Tex. S5 ..... 71.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2 .. 63.00
Massillon,O. R2 ..... 63.00
Midland,Pa. C18 ..... 63.00
Munhall,Pa. C3 ..... 63.00
Sharon,Pa. S3 ..... 63.00
So.Chicago,Ill. C3, R2.. 63.00
So.Duquesne,Pa. C3 ... 63.00
Warren,O. C17 ..... 63.00

SHEET BARS (NT)

Mansfield,O. E6..(GT) $58.00
Sharon,Pa. S3 ..... 57.00

ROUNDS, SEAMLESS TUBE (NT)

Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00

SKELP

Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.25
Warren,O. R2 ..... 3.25
Youngstown C3, R2 .... 3.25

WIRE RODS

AlabamaCity,Ala. R2 .. 3.40
Buffalo W12 ..... 3.40
Cleveland A7 ..... 3.40
Donora,Pa. A7 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Houston,Tex. S5 ..... 3.95
Ind.Harbor,Ind. Y1 .... 3.40
Johnstown,Pa. B2 ..... 3.40
Joliet,Ill. A7 ..... 3.40
Los Angeles B3 ..... 4.20
Monessen,Pa. P7 ..... 3.40
Pittsburg,Calif. C11 .... 4.05
Portsmouth,O. P12 .... 3.40
So. Chicago,Ill. R2..... 3.40
SparrowsPoint B2 ..... 3.50
Sterling,Ill.(1) N15 ..... 3.40
Struthers,O. Y1 ..... 3.40
Torrance,Calif. C11 .... 4.20
Worcester,Mass. A7 .... 3.70

STRUCTURALS
Wide Flange

Bethlehem,Pa. B2 ..... 3.30
Lackawanna,N.Y. B2 ... 3.30
Munhall,Pa. C3 ..... 3.20
So.Chicago,Ill. C3 ..... 3.20

H.-S. Low-Alloy

Aliquippa,Pa. J5 ..... 4.95
Bessemer,Ala. T2 ..... 4.95
Bethlehem,Pa.(14) B2 .. 5.05
Clairton,Pa. C3 ..... 4.95
Fairfield,Ala. T2 ..... 4.95
Fontana,Calif. K1 ..... 6.10
Gary, Ind. C3 ..... 4.95
Ind.Harbor,Ind. I-2, Y1.. 4.95
Johnstown,Pa. B2 ..... 5.05
Lackawna,N.Y.(14) B2 .. 5.05
Munhall,Pa.(14) C3 .... 4.95
So.Chicago,Ill.(14) C3 .. 4.95
Struthers,O. Y1 ..... 4.95

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 ..... 3.25
Bessemer,Ala. T2 ..... 3.25
Bethlehem,Pa. B2 ..... 3.30
Clairton,Pa. C3 ..... 3.25
Fairfield,Ala. T2 ..... 3.25
Fontana,Calif. K1 ..... 3.80
Gary,Ind. C3 ..... 3.25
Geneva,Utah G1 ..... 3.25
Houston,Tex. S5 ..... 3.65
Ind.Harbor,Ind. I-2 .... 3.25
Johnstown,Pa. B2 ..... 3.30
KansasCity,Mo. S5 ..... 3.85
Lackawanna,N.Y. B2 .... 3.30
LosAngeles B3 ..... 3.85
Minnequa,Colo. C10 .... 3.75
Munhall,Pa. C3 ..... 3.25
Niles,Calif.(22) P1 ..... 3.97
Phoenixville,Pa. P4 .... 3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 3.90
So.Chicago,Ill. C3, W14 .. 3.25
So.SanFrancisco B3 .... 3.80
Torrance,Calif. C11 .... 3.85
Weirton,W.Va. W6 ..... 3.25

Alloy Stand. Shapes

Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

SHEET STEEL PILING

Ind.Harbor,Ind. I-2 .... 4.05
Lackawanna,N.Y. B2 .... 4.05
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05
Weirton,W.Va. W6 ..... 4.05

PLATES, Carbon Steel

AlabamaCity,Ala. R2 .. 3.40
Aliquippa,Pa. J5 ..... 3.40
Ashland,Ky.(15) A10 .... 3.40
Bessemer,Ala. T2 ..... 3.40
Clairton,Pa. C3 ..... 3.40
Claymont,Del. W16 .... 3.50
Cleveland J5, R2 ..... 3.40
Coatesville,Pa. L7 ..... 3.50
Conshohocken,Pa. A3 ... 3.50
Ecorse,Mich. G5 ..... 3.65
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Harrisburg,Pa. C5 ..... 3.75
Houston,Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2, Y1.. 3.40
Johnstown,Pa. B2 ..... 3.40
Lackawanna,N.Y. B2 .... 3.40
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.40
Pittsburgh J5 ..... 3.40
Seattle B3 ..... 4.30
Sharon, Pa. S3 ..... 3.40
So.Chicago,Ill. C3, W14 .. 3.40
SparrowsPoint,Md. B2 .. 3.40
Steubenville,O. W10 .... 3.40
Warren,O. R2 ..... 3.40
Weirton,W.Va. W6 ..... 3.40
Youngstown C3, Y1 .... 3.40

PLATES (Universal Mill)

Fontana,Calif. K1 ..... 4.30

PLATES, Open-Hearth Alloy

Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 ... 4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2 .. 4.40

PLATES, Ingot Iron

Ashland,cl(15) A10 .... 3.65
Ashland,lcl(15) A10 .... 4.15
Cleveland,cl R2 ..... 3.65
Warren,O.,cl R2 ..... 3.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland J5, R2 ..... 5.20
Conshohocken,Pa. A3 .. 5.20
Ecorse,Mich. G5 ..... 5.45
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 ..... 5.80
Gary,Ind. C3 ..... 5.20
Geneva,Utah G1 ..... 5.20
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 .. 5.20
Johnstown,Pa. B2 ..... 5.20
Munhall,Pa. C3 ..... 5.20
Pittsburgh J5 ..... 5.20
Sharon,Pa. S3 ..... 5.65
So.Chicago,Ill. C3 ..... 5.20
SparrowsPoint,Md. B2 .. 5.20
Warren,O. R2 ..... 5.20
Youngstown Y1 ..... 5.20

FLOOR PLATES

Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 ... 4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2 ... 3.35
Aliquippa,Pa. J5 ..... 3.35
Alton,Ill.(1) L1 ..... 3.35
Ashland,Ky. (17) A10... 3.35
Atlanta,Ga. A11 ..... 3.50
Bessemer,Ala. T2 ..... 3.35
Buffalo R2 ..... 3.35
Canton,O. R2 ..... 3.35
Clairton,Pa. C3 ..... 3.35
Cleveland R2 ..... 3.35
Ecorse,Mich. G5 ..... 3.55
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.35
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2, Y1.. 3.35
Johnstown,Pa. B2 ..... 3.35
KansasCity,Mo. S5 ..... 3.95
Lackawanna,N.Y. B2 ... 3.35
LosAngeles B3 ..... 4.05
Marion,O. P11 ..... 3.35
Midland,Pa. C18 ..... 3.35
Milton,Pa. B6 ..... 3.35
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.05
N.Tonawanda,N.Y. B11 .. 3.35
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
Seattle B3, N14 ..... 4.10
S.Chicago C3, R2, W14.. 3.35
So.Duquesne,Pa. C3 .... 3.35
S.SanFran.,Cal. B3 .... 4.10
Struthers,O. Y1 ..... 3.35
Torrance,Calif. C11 .... 4.05
Weirton,W.Va. W6 ..... 3.35
Youngstown C3, R2 .... 3.35

BAR SIZE ANGLES; S. SHAPES

Aliquippa,Pa. J5 ..... 3.35
Atlanta,Ga. A11 ..... 3.50
Bethlehem,Pa.(2) B2 .... 3.55
Johnstown,Pa. B2 ..... 3.35
Lackawanna,N.Y. B2 .... 3.35
Niles,Calif. P1 ..... 4.05
Pittsburgh(23) J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
SanFrancisco S7 ..... 4.05
Weirton,W.Va. W6 ..... 3.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 3.75
Buffalo R2 ..... 3.75
Canton,O. R2, T7 ..... 3.75
Clairton,Pa. C3 ..... 3.75
Ecorse,Mich. G5 ..... 4.05
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 3.75
Houston,Tex. S5 ..... 4.15
Ind.Harbor,Ind. I-2, Y1.. 3.75
Johnstown,Pa. B2 ..... 3.75
KansasCity,Mo. S5 ..... 4.35
Lackawanna,N.Y. B2 ... 3.75
LosAngeles B3 ..... 4.80
Massillon,O. R2 ..... 3.75
Midland,Pa. C18 ..... 3.75
S.Chicago C3, R2, W14.. 3.75
So.Duquesne,Pa. C3 .... 3.75
Struthers,O. Y1 ..... 3.75
Warren,O. C17 ..... 3.75
Youngstown C3 ..... 3.75

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. C3 ..... 4.00
Fontana,Calif. K1 ..... 4.75
Gary,Ind. C3 ..... 4.00
Youngstown C3 ..... 4.00

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 5.10
Bessemer,Ala. T2 ..... 5.10
Bethlehem,Pa. B2 ..... 5.10
Clairton,Pa. C3 ..... 5.10
Cleveland R2 ..... 5.10
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.10
Fontana,Calif. K1 ..... 6.15
Gary,Ind. C3 ..... 5.10
Ind.Harbor,Ind. I-2, Y1.. 5.10
Johnstown,Pa. B2 ..... 5.10
Lackawanna,N.Y. B2 ... 5.10
Pittsburgh J5 ..... 5.10
So.Duquesne,Pa. C3 .... 5.10
Struthers,O. Y1 ..... 5.10
Youngstown C3 ..... 5.10

BARS, Cold-Finished Carbon

Aliquippa,Pa. K5 ..... 4.00
Ambridge,Pa. W18..... 4.00
BeaverFalls, M12, R2... 4.00
Buffalo B5 ..... 4.00
Camden,N.J. P13 ..... 4.48
Carnegie,Pa. C12 ..... 4.00
Chicago W18 ..... 4.00
Cleveland A7, C20..... 4.00
Cumberland,Md. C19 ... 3.95
Detroit P17 ..... 4.15
Donora,Pa. A7 ..... 4.00
Ecorse,Mich. G5 ..... 4.30
Elyria,O. W8 ..... 4.00
FranklinPark,Ill. N5 ... 4.00
Gary,Ind. R2 ..... 4.00
Hammond,Ind. L2, M13.. 4.00
Hartford, Conn. R2 .... 4.40
Harvey,Ill. B5 ..... 4.00
Indianapolis M13 ..... 4.20
LosAngeles R2 ..... 5.40
Mansfield,Mass. B5 .... 4.40
Massillon,O. R2, R8.... 4.00
Midland,Pa. C18 ..... 4.00
Monaca,Pa. S17 ..... 4.00
Newark,N.J. W18 ..... 4.40
Plymouth,Mich. P5 ..... 4.25
Pittsburgh J5 ..... 3.95
Putnam,Conn. W18 .... 4.40
Readville,Mass. C14 ... 4.40
St.Louis,Mo. M5 ..... 4.35
So.Chicago,Ill. W14 .... 4.00
SpringCity,Pa.(5) K3 .. 4.48
Struthers,O. Y1 ..... 4.00
Waukegan,Ill. A7 ..... 4.00
Youngstown F3, Y1.... 4.00

BARS, Cold-Finished Alloy

Aliquippa,Pa. K5 ..... 4.65
Ambridge,Pa. W18 ..... 4.65
BeaverFalls,Pa. M12.... 4.65
Bethlehem,Pa. B2 ..... 4.65
Buffalo B5 ..... 4.65
Canton,O. R2, T7..... 4.65
Carnegie,Pa. C12 ..... 4.65
Chicago W18 ..... 4.65
Cleveland A7, C20..... 4.65
Detroit P17 ..... 4.80
Donora,Pa. A7 ..... 4.65
Elyria,O. W8 ..... 4.65
Gary,Ind. R2 ..... 4.65
Hammond,Ind. L2, M13.. 4.65
Hartford,Conn. R2 ..... 4.95
Harvey,Ill. B5 ..... 4.65
Indianapolis M13 ..... 4.85
Lackawanna,N.Y. B2 .. 4.65
Mansfield,Mass. B5 ..... 4.95
Massillon,O. R2, R8..... 4.65
Midland,Pa. C18 ..... 4.65
Monaca,Pa. S17 ..... 4.65
Newark,N.J. W18 ..... 4.95
So.Chicago,Ill. R2, W14.. 4.65
Struthers,O. Y1 ..... 4.65
Waukegan,Ill. A7 ..... 4.65
Worcester,Mass. A7 .... 4.95
Youngstown F3, Y1 .... 4.65

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2 ... 3.35
Alton,Ill.(6) L1 ..... 3.35
Atlanta,Ga. A11 ..... 3.50
Buffalo R2 ..... 3.35
Cleveland R2 ..... 3.35
Emeryville,Calif. J7 .... 4.10
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.35
Houston,Tex. S5 ..... 3.75
Ind.Harbor,Ind. I-2, Y1 .. 3.35
Johnstown,Pa. B2 ..... 3.35
KansasCity,Mo. S5 ..... 3.95
Lackawanna,N.Y. B2 ... 3.35
LosAngeles B3 ..... 4.05
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.05
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Portland,Oreg. O4 ..... 4.10
Seattle,Wash. B3, N14.. 4.10
So.Chicago,Ill. R2 ..... 3.35
So.Duquesne,Pa. C3 .... 3.35
So.SanFrancisco B3 .... 4.10
SparrowsPoint,Md. B2 .. 3.35
Struthers,O. Y1 ..... 3.35
Torrance,Calif. C11 .... 4.05
Youngstown C3, R2 .... 3.35

BARS, Reinforcing (Fabricated; to Consumers)

Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 .. 4.25
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.25
Pittsburgh J5 ..... 4.25
Seattle B3, N14 ..... 5.00
So.SanFrancisco B3 .... 5.00
SparrowsPt., 1⅛-1¼" B2.. 4.83
SparrowsPt., ¼-1" B2 .. 4.25

RAIL STEEL BARS

ChicagoHts.,Ill(3) I-2 .. 3.25
FortWorth,Tex.(4) T4 .. 4.32
Hntngtn,W.Va.(3) W7 .. 3.35
Moline,Ill.(3) R2 ..... 3.35
Williamsport(2,3) S19 .. 3.35
Williamsport(4) S19 .... 3.85

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 .. 9.50
Economy,Pa.(D.R.)B14.. 11.00
Economy(Stablt) B14 .. 11.30
McK.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 .... 11.25
McK.Rks.(Staybolt) L5.. 12.75

BARS, Hot-Rolled Ingot Iron

Ashland,Ky.(17) A10 ... 3.60

SHEETS, Hot-Rolled Steel (18 gage and heavier)

AlabamaCity,Ala. R2 .. 3.25
Ashland,Ky.(8) A10 .... 3.25
Butler,Pa. A10 ..... 3.25
Cleveland J5, R2 ..... 3.25
Conshohocken,Pa. A3 ... 3.35
Ecorse,Mich.(8) G5 .... 3.45
Fairfield,Ala. T2 ..... 3.25
Fontana,Calif. K1 ..... 4.15
Gary,Ind. C3 ..... 3.25
Ind.Harbor,Ind. I-2, Y1.. 3.25
Irvin,Pa. C3 ..... 3.25
Kokomo,Ind. C16 ..... 3.35
Lackawanna,N.Y. B2 .... 3.25
Munhall,Pa. C3 ..... 3.25
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 .... 3.95
Pittsburgh J5 ..... 3.25
Sharon,Pa. S3 ..... 3.25
So.Chicago,Ill. W14 .... 3.25
SparrowsPoint,Md. B2 .. 3.25
Steubenville,O. W10 .... 3.25
Torrance,Calif. C11 .... 3.95
Warren,O. R2 ..... 3.25
Weirton,W.Va. W6 ..... 3.25
Youngstown C3, Y1 .... 3.25

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)

AlabamaCity,Ala. R2 .... 4.40
Dover,O. R1 ..... 5.00
Fairfield,Ala. T2 ..... 4.15
Ind.Harbor,Ind. I-2 .... 4.15
Kokomo,Ind. C16 ..... 4.25
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.15
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 .... 5.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 ..... 4.00
Cleveland J5, R2 ..... 4.00
Ecorse,Mich. G5 ..... 4.20
Fairfield,Ala. T2 ..... 4.00
Follansbee,W.Va. F4 .... 4.00
Fontana,Calif. K1 ..... 4.90
Gary,Ind. C3 ..... 4.00
GraniteCity,Ill. G4 ..... 4.20
Ind.Harbor,Ind. I-2, Y1.. 4.00
Irvin,Pa. C3 ..... 4.00
Lackawanna,N.Y. B2 .... 4.00
Middletown,O. A10 .... 4.00
Pittsburg,Calif. C11 .... 4.95
Pittsburgh J5 ..... 4.00
SparrowsPoint,Md. B2 .. 4.00
Steubenville,O. W10 .... 4.00
Warren,O. R2 ..... 4.00
Weirton,W.Va. W6 ..... 4.00
Youngstown Y1 ..... 4.00

SHEETS, Cold-Rolled, High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.05
Ecorse,Mich. G5 ..... 6.25
Fontana,Calif. K1 ..... 6.95
Gary,Ind. C3 ..... 6.05
Ind.Harbor,Ind. I-2, Y1.. 6.05
Irvin,Pa. C3 ..... 6.05
Lackawanna,N.Y. B2 .. 6.05
Pittsburgh J5 ..... 6.05
Sharon,Pa. S3 ..... 6.05
SparrowsPoint,Md. B2 .. 6.05
Warren,O. R2 ..... 6.05
Weirton,W.Va. W6 ..... 6.05
Youngstown Y1 ..... 6.05

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy

Cleveland J5, R2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Calif. K1	6.64
Gary,Ind. C3	4.95
Ind.Harbor,Ind. I-2, Y1	4.95
Irvin,Pa. C3	4.95
Lackawanna,N.Y. B2	4.95
Pittsburgh J5	4.95
Sharon,Pa. S3	4.95
So.Chicago,Ill. C3	4.95
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3 Y1	4.95

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky.(8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	5.65
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo,Ind. C16	4.80
MartinsFerry,O. W10	4.40
Niles,O. N12	4.40
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. C3	6.75
SparrowsPoint,Md. B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	4.95

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2	5.15
Niles,O. R2	5.15
Weirton,W.Va. W6	5.00

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Culvert, No. 16 Flat

	Cu Alloy	Cu Fe
Ashland A10	5.00	...
Canton,O, R2	5.05	5.50
Fairfield,Ala. T-2	5.00	5.35
Gary C3	5.00	5.35
GraniteCity G4	5.40	5.70
Irvin C3	5.00	5.35
Kokomo C16	5.40	...
MartinsFy,O. W10	5.00	5.35
Pittsburg,Cal. C11	5.75	...
SparrowsPt. B2	5.00	...
Torrance,Cal. C11	5.75	...

SHEETS, Culvert, No. 16 Flat Ingot Iron

Ashland,Ky. A10	5.25

SHEETS, Well Casing

Torrance,Calif. C11	4.75
Youngstown C3	3.75

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Long Terne, Steel (No. 10; Commercial Quality)

BeechBotm.,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Weirton,W.Va. W6	4.80

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.75
Gary,Ind. C3	6.65
Ind.Harbor,Ind. I-2	6.65
Irvin,Pa. C3	6.65
Weirton,W.Va. W6	6.65
Yorkville,O. W10	6.65

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.20

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Yorkville,O. W10	8.10

SHEETS, Coated Ternes, 12 lb

Gary,Ind. C3	8.95
Yorkville,O. W10	8.95

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.50
Cleveland R2	3.85
Ind.Harbor,Ind. I-2	3.50
Warren,O. R2	3.85

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2	4.60
Middletown,O. A10	4.50
Warren,O. R2	4.60

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.95

SHEETS, ZINCGRIP No. 10 Flat, Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enam'lg. Iron, No. 12

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Niles,O. M4	4.90
Youngstown Y1	4.40

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.75
Fairfield,Ala. T2	5.85
Gary,Ind. C3	5.75
GraniteCity,Ill. G4	5.95
Ind.Harbor,Ind. I-2, Y1	5.75
Irvin,Pa. C3	5.75
Niles,O. R2	5.75
Pittsburg,Calif. C11	6.50
SparrowsPoint,Md. B2	5.85
Warren,O. R2	5.75
Weirton,W.Va. W6	5.75
Yorkville,O. W10	5.75

TIN PLATE, American 1.25 Coke (Base Box)

	1.50 lb	1.50 lb
Aliquippa J5	$7.50	$7.75
Fairfield,Ala. T2.	7.60	7.85
Gary C3	7.50	7.75
Gran.City,Ill, G4.	7.70	7.95
Ind.Harb. I-2, Y1	7.50	7.75
Irvin,Pa. C3	7.50	7.75
Pitts.,Cal. C11	8.25	8.50
Sp.Pt.,Md. B2	7.60	7.85
Warren R2	7.50	7.75
Weirton W6	7.50	7.75
Yorkville,O. W10.	7.50	7.75

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.60

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.25
Butler,Pa. A10	3.25
Carnegie,Pa.(9) S18	3.50
Detroit M1	3.45
Ecorse,Mich. G5	3.45
Fairfield,Ala. T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.25
N.Tonawanda,N.Y. B11	3.30
Pittsburg,Calif. C11	4.00
Pittsburgh J5	3.25
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa.(25) S3	3.25
Sharon,Pa.(9) S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.25
Youngstown C3 Y1	3.25

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Harrison,N.J. C18	9.80
NewBritn,Conn.(10) S15	9.50
Pawtucket,R.I.(11) N8	9.50
Pawtucket,R.I.(12) N8	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Carbon

Berea,O. C7	6.10
Bridgeprt,Conn.(10) S15	4.00
Butler,Pa. A10	4.00
Chicago,Ill. T6	4.15
Cleveland A7, J5	4.00
Detroit, D2, D3	4.25
Detroit M1	4.20
Dover,O. G6	4.00
Ecorse,Mich. G5	4.20
Follansbee,W.Va. F4	4.00
Fontana,Calif. K1	4.90
Ind.Harbor,Ind. I-2	4.00
Lackawanna,N.Y. B2	4.00
LosAngeles C1	5.00
Mattapan,Mass.(21) T6	4.50
Middletown,O. A10	4.00
NewBritain(10) S15	4.00
NewCastle,Pa. B4, E5	4.00
NewHaven,Conn. A7, D2	4.50
NewKensington,Pa. A6	4.00
NewYork W3	5.00
Pawtucket,R.I.(11) N8	4.55
Pawtucket,R.I.(21) N8	4.50
Pawtucket,R.I. R3	4.50
Pittsburgh J5	4.00
Riverdale,Ill. A1	4.15
Sharon,Pa. S3	4.00
SparrowsPoint,Md. B2	4.00
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	4.50
Warren,O. R2, T5	4.00
Weirton,W.Va. W6	4.00
Youngstown C8, Y1	4.00

STRIP, Cold-rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.05
Dover,O. G6	6.05
Ecorse,Mich. G5	6.25
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.05
Pittsburgh J5	6.05
Sharon,Pa. S3	6.05
SparrowsPoint,Md. B2	6.05
Warren,O. R2	6.05
Weirton,W.Va. W6	6.05
Youngstown Y1	6.05

STRIP, Electro Galvanized

Weirton,W.Va. W6	4.00
Youngstown C8	4.00

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.45	$6.70	$7.00
Fairfield,Ala. T2	6.55	6.80	7.10
Gary,Ind. C3	6.45	6.70	7.00
GraniteCity,Ill. G4	6.65	6.90	7.20
Ind.Harbor,Ind. I-2, Y1	6.45	6.70	7.00
Irvin,Pa. C3	6.45	6.70	7.00
Niles,O. R2	6.45	6.70	7.00
Pittsburg,Calif. C11	7.20	7.45	7.75
SparrowsPoint,Md. B2	6.55	6.80	7.10
Weirton,W.Va. W6	6.45	6.70	7.00
Yorkville,O. W10	6.45	6.70	7.00

SHEET SILICON (24 Gage Base)

	Field	Arm.	Elec.	Motor	Dyn.
BeechBottom,W.Va. W10	...	5.45	5.95	6.70	7.50
Brackenridge,Pa. A4	...	...	5.95	6.70	7.50
Follansbee,W.Va. F4	...	...	7.70	8.45	9.25
GraniteCity,Ill. G4	...	...	6.15	6.90	7.70
Ind.Harbor,Ind. I-2	5.15	5.45	5.95	...	...
Mansfield,O. E6	5.15	5.45	5.95	6.70	...
Niles,O. M4	5.65	5.95	6.45	...	...
Niles,O. N12	...	5.45	5.95	...	...
Toronto,O. F4	...	...	7.70	8.45	9.25
Vandergrift,Pa. C3	...	5.45	5.95	6.70	7.50
Warren,O. R2	...	5.45	5.95	6.70	...
Zanesville,O. A10	...	5.45	5.95	6.70	7.50

COILS AND CUT LENGTHS, Cold-Rolled, Silicon

	Field	Arm.	Elec.	Motor	Dyn.
Vandergrift,Pa. C3	...	5.70	6.20	6.95	7.75
Warren,O. R2	5.40	5.70	6.20	6.95	7.75

SHEETS, Silicon Transformer Grade

	72	65	58	52
BeechBottom,W.Va. W10	8.05	8.60	9.30	10.10
Brackenridge,Pa. A4	8.05	8.60	9.30	....
Follansbee,W.Va. F4	9.80	10.35	11.05	11.85
Toronto,O. F4	9.80	10.35	11.05	11.85
Vandergrift,Pa. C3	8.05	8.60	9.30	10.10
Zanesville,O. A10	8.05	8.60	9.30	10.10

COLD-REDUCED COILS and Cut Lengths, Silicon

	72	T-100	T-90	T-80
Butler,Pa. A10	...	12.35	13.60	14.85
Vandergrift,Pa. C3	8.30	11.35	12.60	13.85
Warren,O. R2	8.30	....	....	....

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.25-0.40C	0.40-0.60C	0.60-0.80C	0.80-1.05C	1.05-1.35C
Bridgeprt,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.50	6.10	8.05	10.35
Chicago T6	4.25	5.65	6.25	8.20	10.50
Cleveland A7	4.00	5.50	6.10	8.05	10.35
Dover,O. G6	4.00	5.50	6.10	7.85	10.15
Harrison,N.J. C18	...	...	6.40	8.35	10.65
Mattapan,Mass. T6	4.50	5.80	6.40	8.35	10.65
NewBritn.,Conn.(10) S15	4.00	5.50	6.10	8.05	10.35
NewCastle,Pa. B4	4.00	5.50	6.10	...	....
NewCastle,Pa. E5	4.00	5.50	6.10	8.05	10.35
NewYork W3	...	5.80	6.40	8.35	10.65
Pawtucket,R.I. N8 Cleve.orPitts.Base	4.55	5.50	6.10	8.05	10.35
Worcester,Mass.Base	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.00	5.50	6.10	8.05	10.35
Trenton,N.J. R5	...	6.30	6.90	8.85	11.15
Union,N.J. H6	4.40	6.35	6.35	8.30	10.50
Wallingford,Conn. W2	4.50	5.80	6.40	8.05	10.35
Weirton,W.Va. W6	4.00	5.50	6.10	8.05	10.35
Worcester,Mass. A7	4.30	5.80	6.40	8.35	10.65
Worcester,Mass. T6	4.50	5.80	6.40	8.35	10.65
Youngstown C8	4.50	5.50	6.10	8.05	10.35

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold-Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cld.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Col. Steel & Shafting Co.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Co.
D4 Disston & Sons,Henry
D6 Driver Harris Co.

E1 Eastrn.Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Co.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.
H6 Hind Steel Co. Inc.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

RIP, Hot-Rolled, High-Strength Low-Alloy

essemer,Ala. T2 .....4.95
leveland J5 .....4.95
corse,Mich. G5 .....5.15
airfield,Ala. T2 .....4.95
ontana,Cal. K1 .....6.64
ary,Ind. C3 .....4.95
od.Harb.,Ind. I-2, Y1 ..4.95
ackawanna,N.Y. B2 ...4.95
ittsburgh J5 .....4.95
haron,Pa. S3 .....4.95
parrowsPoint,Md. B2 ..4.95
Varren,O. R2 .....4.95
Veirton,W.Va. W6 .....4.95
oungstown C3, Y1 ....4.95

IGHT COOPERAGE HOOP

tlanta A11 .....3.60
Riverdale,Ill. A1 .....3.60
Sharon,Pa. S3 .....3.60
Youngstown C3 .....3.60

WIRE, Cold-Rolled Flat

Chicago T6 .....5.35
Cleveland A7 .....5.00
Dover,O. G6 .....5.00
Fostoria,O. S1 .....5.50
Kokomo,Ind. C16 .....5.00
Massillon,O. R8 .....5.00
Monessen,Pa. P7 .....5.00
Pawtucket,R.I.(11) N8..5.55
Pawtucket,R.I.(12) N8..5.50
Trenton,N.J. R5 .....5.80
Worcester,Mass. A7 ....5.30
Worcester,Mass. T6 ....5.30

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(19) K4 ..7.70
Buffalo W12 .....7.70
Chicago W13 .....7.70
Cleveland A7 .....7.70
Fostoria,O. S1 .....8.20
Johnstown,Pa. B2 .....7.70
Kokomo,Ind. C16 .....7.70
Palmer,Mass. W12 .....8.00
Portsmouth,O. P12 .....7.70
Struthers,O. Y1 .....7.70
Trenton,N.J. R5 .....8.50
Waukegan,Ill. A7 .....7.70
Worcester,Mass. A7, T6.8.00

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Aliquippa J5	9.05	10.55
Bartnvill(19) K4.	9.05	10.55
Cleveland A7	9.05	10.55
Fostoria,O. S1	9.65	11.15
Johnstown B2	9.05	10.55
Kokomo C16	9.05	10.55
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	9.40	10.90
Prtsmth.(18) P12.	9.05	10.55
SparrowsPt. B2	9.15	10.65
Struthers Y1	9.05	10.55
Waukegan A7	9.05	10.55

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2 ...4.15
Aliquippa,Pa. J5 .....4.15
Alton,Ill.(1) L1 .....4.15
Bartonville,Ill.(1) K4 ...4.15
Buffalo W12 .....4.15
Chicago W13 .....4.15
Cleveland A7, C20 .....4.15
Crawfrdsvll,Ind. M8 ....4.30
Donora,Pa. A7 .....4.15
Duluth A7 .....4.15
Fairfield,Ala. T2 .....4.15
Fostoria,O.(24) S1 .....4.65
Houston S5 .....4.55
Johnstown,Pa. B2 .....4.15
Joliet,Ill. A7 .....4.15
KansasCity,Mo. S5 .....4.75
Kokomo,Ind. C16 .....4.25
LosAngeles B3 .....5.10
Minnequa,Colo. C10 ....4.50
Monessen,Pa. P7 .....4.15
Newark,6-8ga. I-1 .....4.75
No.Tonawanda B11 ....4.18
Palmer,Mass. W12 .....4.45
Pittsburg,Calif. C11 ....5.10
Portsmouth,O. P12 .....4.15
Rankin,Pa. A7 .....4.15
So.Chicago,Ill. R2 .....4.15
So.SanFrancisco C10 ...5.10
SparrowsPoint,Md. B2 ..4.25
Sterling,Ill.(1) N15 .....4.15
Struthers,O. Y1 .....4.15
Torrance,Calif. C11 ....5.10
Waukegan,Ill. A7 .....4.15
Worcester,Mass. A7, T6.4.45

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....5.55
Alton,Ill.(1) L1 .....5.55
Bartonville,Ill.(19) K4 ..5.55
Buffalo W12 .....5.55
Cleveland A7 .....5.55
Donora,Pa. A7 .....5.55
Duluth A7 .....5.55
Fostoria,O. S1 .....6.05
Johnstown,Pa. B2 .....5.55
LosAngeles B3 .....6.50
Milbury,Mass.(12) N6 ..5.85
Monessen,Pa. P7 .....5.55
Palmer,Mass. W12 .....5.85
Pittsburg,Calif. C11 ....6.50
Portsmouth,O. P12 .....5.55
So.Chicago,Ill. R2 .....5.55
SparrowsPoint,Md. B2 ..5.65
Struthers,O. Y1 .....5.55
Trenton,N.J. A7 .....5.85
Trenton,N.J. R5 .....6.35
Waukegan,Ill. A7 .....5.55
Worcester A7,J4,T6,W12.5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	7.10	7.40	7.80
Buffalo W12	7.50	7.80	8.20
Cleveland A7	7.50	7.80	8.20
Donora,Pa. A7	7.50	7.80	8.20
Fostoria,O. S1	8.00	8.30	8.70
Johnstown,Pa. B2	7.50	7.80	8.20
Monessen,Pa. P7	7.50	7.80	8.20
NewHaven,Conn. A7	7.80	8.10	8.50
Palmer,Mass. W12	7.80	8.10	8.50
Portsmouth,O. P12	7.50	7.80	8.20
SparrowsPoint,Md. B2	7.60	7.90	8.30
Struthers,O. Y1	7.50	7.80	8.20
Trenton,N.J. A7	7.80	8.10	8.50
Trenton,N.J. R5	8.00	8.30	8.70
Waukegan,Ill. A7	7.50	7.80	8.20
Williamsport,Pa. B2	7.60	7.90	8.30
Worcester,Mass. J4	7.80	8.10	8.50

WIRE, Merchant Quality

(6 to 8 gage)	An'ld.	Galv.
Ala.,City, R2	4.80	5.25
Aliquippa J5	4.80	5.25
Atlanta A11	4.90	5.35
Bartnville.(19) K4	4.80	5.25
Buffalo W12	4.80	...
Cleveland A7	4.80	5.25
Crawfrdvll. M8	4.95	5.40
Donora A7	4.80	5.25
Duluth A7	4.80	5.25
Fairfield T2	4.80	5.25
Houston,Tex. S5.	5.20	5.65
Johnstown B2	4.80	5.25
Joliet,Ill. A7	4.80	5.25
KansasCity,Mo. S5	5.40	5.85
Kokomo C16	4.90	5.35
LosAngeles B3	5.75	...
Minnequa C10	5.15	5.60
Monessen P7	4.80	5.25
Palmer,Mass W12	5.10	...
Pitts.,Cal. C11	5.75	6.20
Portsmth.(18) P12	4.80	5.25
Rankin A7	4.80	5.25
So.Chicago R2	4.80	5.25
So.S.Fran. C10	5.75	6.20
SparrowsPt. B2	4.90	5.35
Sterling,Ill.(1)N15	4.80	5.25
Struthers,O. Y1	4.80	5.25
Torrance,Cal. C11	5.75	...
Worcester A7	5.10	5.55

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.20
Alton,Ill.(1) L1 .....5.20
Buffalo W12 .....5.20
Cleveland A7 .....5.20
Donora,Pa. A7 .....5.20
Duluth A7 .....5.20
Johnstown,Pa. B2 .....5.20
LosAngeles B3 .....6.15
Monessen P7 .....5.20
NewHaven,Conn. A7 ...5.50
Palmer,Mass. W12 .....5.50
Pittsburg,Calif. C11 ....6.15
Portsmouth,O. P12 .....5.20
So.Chicago,Ill. R2 .....5.20
SparrowsPoint,Md. B2 ..5.30
Struthers,O. Y1 .....5.20
Torrance,Calif. C11 ....6.15
Trenton,N.J. A7 .....5.50
Waukegan,Ill. A7 .....5.20
Worcester,Mass. A7 ....5.50

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	...123
Aliquippa,Pa. J5	123
Atlanta A11	125
Bartonville,Ill.(19) K4	..123
Crawfordsville M8	126
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Houston,Tex. S5	131
Johnstown,Pa. B2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	130
Monessen,Pa. P7	123
Pittsburg,Calif. C11	143
Portsmouth,O.(18) P12...	123
Rankin,Pa. A7	123
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10...	143
SparrowsPoint,Md. B2	..125
Sterling,Ill.(1) N15	123

FENCE POSTS	Col.
Duluth A7	112
Huntington,W.Va. W7	..112
Johnstown,Pa. B2	112
Joliet,Ill. A7	112
Minnequa,Colo. C10	120
Moline,Ill. R2	116
Williamspt,Pa. S19.	.n.t.$120

WOVEN FENCE, 9-15½ gage

	Col.
Ala.City,Ala.,17-18ga. R2.	175
AlabamaCity,Ala. R2....	109
Aliquip.,Pa.9-14½ga. J5..	109
Atlanta A11	111
Bartonville,Ill.(19) K4 ..	109
Crawfordsvll,Ind. M8 ...	112
Donora,Pa. A7	109
Duluth A7	109
Houston,Tex. S5	117
Fairfield,Ala. T2	109
Johnstown,Pa. B2	109
Johnstn,17ga..6" B2	183
Johnstn,17ga.4" B2	186
Joliet,Ill. A7	109
KansasCity,Mo. S5	121
Kokomo,Ind. C16	111
Minnequa,Colo. C10	116
Monessen,Pa. P7	109
Pittsburg,Calif. C11	132
Portsmouth,O.(18) P12..	109
Rankin,Pa. A7	109
So.Chicago,Ill. R2	109
Sterling,Ill.(1) N15	109

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	...106
Atlanta A11	107
Bartonville,Ill.(19) K4	..106
Chicago W13	106
Crawfordsville M8	109
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Joliet,Ill. A7	106
Kokomo,Ind. C16	108
Minnequa,Colo. C10	113
Pittsburg,Calif. C11	130
Portsmouth,O.(18) P12	.106
So.Chicago,Ill. R2	106
So.SanFran., Calif. C10.	130
SparrowsPoint,Md. B2	..108
Sterling,Ill.(1) N15	106

NAILS & STAPLES, Stock To Dealers & Mfrs. (7)

AlabamaCity,Ala. R2 ...103
Aliquippa,Pa. J5 103
Atlanta A11 105
Bartonville,Ill.(19) K4 ..103
Chicago,Ill. W13 103
Cleveland A9 109
Crawfordsville M8 106
Donora,Pa. A7 103
Duluth A7 103
Fairfield,Ala. T2 103
Houston,Tex. S5 111
Johnstown,Pa. B2 103
Joliet,Ill. A7 103
KansasCity,Mo. S5 115
Kokomo,Ind. C16 105
Minnequa,Colo. C10 110
Monessen,Pa. P7 103
Pittsburg,Calif. C11 122
Portsmouth,O. P12 103
Rankin,Pa. A7 103
So.Chicago,Ill. R2 103
SparrowsPoint,Md. B2 ..105
Sterling,Ill.(1) N15 103
Torrance,Calif. C11 123
Worcester,Mass. A7 109

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ..5.20
Bartonville,Ill.(19) K4 ..5.20
Donora,Pa. A7 .....5.20
Duluth A7 .....5.20
Johnstown,Pa. B2 .....5.20
Joliet,Ill. A7 .....5.20
Kokomo,Ind. C16 .....5.30
Minnequa,Colo. C10 ....5.55
Pittsburg,Calif. C11 ....6.15
Portsmouth,O. P12 ....5.20
Rankin,Pa. A7 .....5.20
So.Chicago,Ill. R2 .....5.20
SparrowsPoint,Md. B2..5.30
Worcester,Mass. A7 ....5.50

NAILS, Cut (100 lb keg)

Conshohocken,Pa. A3 ..$6.75
Wheeling,W.Va. W10 ...6.75

AXLES

Fairfield,Ala. T2 .....5.20
Gary,Ind. C3 .....5.20
Ind.Harbor,Ind. S13 ....5.20
Johnstown,Pa. B2 .....5.20
McKeesRocks.Pa. C3 ...5.20

TIE PLATES

Fairfield,Ala. T2 .....4.05
Gary,Ind. C3 .....4.05
Ind.Harbor,Ind. I-2 ....4.05
Lackawanna,N.Y. B2 ...4.05
Minnequa,Colo. C10 ....4.05
Pittsburg,Calif. C11 ....4.20
Pittsburgh R2 .....4.05
Seattle B3 .....4.50
Steelton,Pa. B2 .....4.05
Torrance,Calif. C11 ....4.20
Weirton,W.Va. W6 .....4.05

JOINT BARS

Bessemer,Pa. C3 .....4.25
Fairfield,Ala. T2 .....4.25
Ind.Harbor,Ind. I-2 .....4.25
Joliet,Ill. C3 .....4.25
Lackawanna,N.Y. B2 ...4.25
Minnequa,Colo. C10 ....4.25
Steelton,Pa. B2 .....4.25

TRACK BOLTS (20) Treated

Fairfield,Ala. T2 .....8.50
Lebanon,Pa. B2 .....8.50
Minnequa,Colo. C10 ....8.25
Pittsburgh,Pa. O3, P14 .8.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....5.35
Ind.Harbor,Ind. I-2, Y1 .5.35
Kansas City, Mo. S5 ...5.60
Lebanon,Pa. B2 .....5.35
Minnequa,Colo. C10 ....5.35
Pittsburgh J5 .....5.35
So.Chicago,Ill. R2 .....5.35
Struthers,O. Y1 .....5.35
Youngstown R2 .....5.35

LIGHT RAILS, Rail Steel

Huntington,W.Va. W7 ..3.55
Williamsport,Pa. S19 ...3.55

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb. Under
Bessemer,Pa. C3	3.20	3.10	3.15	3.55
Ensley,Ala. T2	3.20	3.10	3.15	3.55
Fairfield,Ala. T2	...	...	...	3.55
Gary,Ind. C3	3.20	3.10	3.15	...
Ind.Harbor,Ind. I-2	3.20	3.10	3.15	...
Johnstown,Pa. B2	...	...	...(16)	3.55
Lackawanna B2	3.20	3.10	...	3.55
Minnequa,Colo. C10	3.20	3.10	...	4.25
Steelton,Pa. B2	3.20	3.10	...	...

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng High Carb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S7 Simmonds Co.
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U4 Universal-Cyclops Steel
V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Corp.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn. Auto. Mach. Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Co.
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	....19.00	18W,4Cr,3V	.....114.50
Extra Carbon	....22.00	18W,4Cr,2V,9Co	.....168.50
Spec. Carbon	....26.50	18W,4Cr,2V,6Co	.....154.00
Oil Hardening	...29.00	18.25W,4.25Cr,1V,4.75Co	...142.00
Hi-Carbon-Cr	....52.00	20.25W,4.25Cr,,1.6V,12.25Co	266.50
Cr Hot Wrk.	....29.00	1.5W,4Cr,1V,8.5Mo	.....65.00
18W,4Cr,1V	.....90.50	6.4W,4.5Cr,1.9V,5Mo	.....69.50
18W,4Cr,2V	....102.50	6W,4Cr,3V,6Mo	.....88.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles. (3) Merchant. (4) Reinforcing. (5) Philadelphia del. (6) Chicago or Birm. Base. (7) To jobbers, 3 cols. lower. (8) 16 gage and heavier. (9) 6" and narrower. (10) Pittsburgh Base. (11) Cleveland & Pittsburgh Base. (12) Worcester, Mass. Base. (13) 3" & wider; over ½" to under 3" 5.50c. (14) Also wide flange beams. (15) ½" and thinner. (16) 40 lb and under. (17) Flats only. (18) To dealers. (19) Chicago & Pittsburgh Base. (20) Deduct 0.25c for untreated. (21) New Haven, Conn. Base. (22) Del. San Fran. Bay area. (23) Angles 1"x1" to 1¼"x1¼" only. (24) Deduct 0.35c for finer than 15 Ga. (25) Wider than 6".

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % —Black— A	B	C	—Galvanized— D	E	F
⅛	5.5c	0.24	41.5	39.5	38.5	13.5	11.5	10.5
¼	6.0	0.42	39.5	37.5	36.5	15.5	13.5	12.5
⅜	6.0	0.57	36	34	33	12.5	10.5	9.5
½	8.5	0.85	43	41	42	26.5	24.5	25.5
¾	11.5	1.13	46	44	45	30.5	28.5	29.5
1	17.0	1.68	48.5	46.5	47.5	33.5	31.5	32.5
1¼	23.0	2.28	49	47	48	34	32	33
1½	27.5	2.73	49.5	47.5	48.5	34.5	32.5	33.5
2	37.0	3.68	50	48	49	35	33	34
2½	58.5	5.82	50.5	48.5	49.5	35.5	33.5	34.5
3	76.5	7.62	50.5	48.5	49.5	35.5	33.5	34.5

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va. 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10; Wheatland, Pa., 2 points lower on ⅛ through ⅜", W9. Following make ½ through 3" only: Lorain, O. N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

Columns B & E: Sparrows Point Md. B2; Wheatland, Pa., ⅛" through ⅜", W9.

Columns C & F: Alton, Ill. (Lorain, O. base) L1; Indiana Harbor, Ind., ½" through 3", Y1.

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜" W10; Wheatland, Pa., except 2 pts lower on ⅛" through ⅜" W9. Following make ½" through 3" only: Lorain N3; Youngstown R2, Y1; Aliquippa, Pa. J5. Fontana, Calif., K1 quotes 11 points lower on ½" through 3" continuous weld.

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	38.5	23	38.5	23
2½	58.5	5.82	41.5	26	41.5	26
3	76.5	7.62	41.5	26	41.5	26
3½	92.0	9.20	43.5	28	43.5	28
4	$1.09	10.89	43.5	28	43.5	28
5	1.48	14.81	43.5	28	43.5	28
6	1.92	19.18	43.5	28	43.5	28

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 4 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	—Seamless— H.R.	C.D.	Elec. Weld H.R.	C.D.
1	13	11.50	13.39	13.00	13.00
1¼	13	13.62	15.87	13.21	15.39
1½	13	15.05	17.71	14.60	17.18
1¾	13	17.11	20.15	16.60	19.54
2	13	19.18	22.56	18.60	21.89
2¼	13	21.37	25.16	20.73	24.40
2¼	12	23.54	27.70	22.83	26.88
2½	12	25.79	30.33	25.02	29.41
2¾	12	27.33	32.14	26.51	31.18
3	12	28.68	33.76	27.82	32.74
3¼	11	33.39	39.29	32.39	38.11
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78
4½	9	58.99	69.42	....	....
5	9	68.28	80.35	....	....
6	7	104.82	123.33	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pacific Tube Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	—Plates— Carbon Base 10%	20%	—Strip— Cold-Rolled Carbon Base 10% Both Sides	Hot-Rolled 10% Both Sides	—Sheets— Carbon Base 10%	20%	Copper Base Both Sides
302	....	....	....	....	19.75	21.50–	75.00
304	22.50	26.50	....	....	20.75	22.50–	77.00
305	....	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....	....
310	32.50	36.50	....	....	....	....	105.00
316	27.00	31.00	....	....	26.00	28.00–	....
317	30.50	34.50	....	....	....	....	....
318	29.50	33.50	....	....	....	....	....
321	23.50	27.50	....	....	23.00	25.00	90.00
347	25.00	29.00	....	....	24.00	26.00–	94.00
405	18.75	24.75	....	....	....	....	....
410	18.25	24.25	....	....	....	....	....
430	18.25	24.25	....	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	....	88.00
Inconel	36.00	46.00	....	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	....	83.00
Copper*	....	....	19.75†	23.75†	....	....	....

* Deoxidized. † Deduct 4.25c for hot-rolled. Production for carbon base products are: Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

(To consumers)

F.o.b. midwestern plants. Additional discounts on carriage, machine bolts, 5 for cl; 15 for full containers, except tire and plow bolts.

CARRIAGE, MACHINE BOLTS

(Per cent off list)

½-in., smaller; up to 6 in. long 35
⅝ & ⅞ x 6 in., shorter. 37
⅞-in. & larger x 6 in., shorter 34
All diameters longer than 6-in. 30
Tire bolts 25
Plow bolts 47
Lag bolts, 6 in., shorter 37
Lag bolts, longer than 6 in. 35

NUTS

Semifinished hexagon	A.S. Light	Reg. & Heavy
⅞-in., smaller	.41 off	....
½-in., smaller	....	38 off
½-in.-1-in.	.39 off	....
⅛-in.-1-in.	....	37 off
1⅛-in.-1½-in.	.37 off	35 off
1⅝-in., larger	.34 off	28 off

Additional discount of 15 for full containers.

STOVE BOLTS

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

SQUARE HEAD SET SCREWS

Upset 1-in. & smaller 51 off
¾, ⅞, & 1 x 6-in. & shorter ..... 35 off
Headless, ¼-in., larger 31 off

HEXAGON CAP SCREWS

(Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright) ..... 46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter ..... 40 off

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 6.75c
⅞-in., under ..... 48 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

—Inches— Diam.	Length	Cents per lb.
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4,5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
303...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	42.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge, Pa., sheets A4.
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c, and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk, N. Y., bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 42.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars, wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars, sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7.
West Leechburg, Pa., strip, except Type 309 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 20.00
Toluol, one deg..19.00-23.50
Industrial xylol ..20.50-26.50

Per ton bulk, ovens
Sulphate of ammonia..$45.00

Per pound, ovens
Phenol, 40 (carlots, returnable drums) 13.25
Do., less than carlots..14.00
Do., tank cars 12.50

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron: 98+% Fe, carlots	15.00
Swedish, c.i.f. New York, in bags	7.40-8.50
Electrolytic Iron: Annealed, 99.5% Fe.	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron: 97.9-99.8%, size 5 to 10 microns	.65.00-130.00
Aluminum: 1500-lb lots, freight allowed	29.00
Atomized, 500-lb drums, freight allowed	30.50
Brass, 10-ton lots	23.25-26.25
Copper: Electrolytic	28.625
Reduced	27.75
Lead	19.25
Manganese: Minus 100 mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	.34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302	75.00
Zinc, 10-ton lots	.15.50-18.25
	Dollars
Tungsten: 99%, minus 80 to 200 mesh, freight allowed, 1000 lb and over	2.90
500 to 1000 lb	2.95
less than 500 lb	3.05
98.8%, minus 65 mesh, freight allowed, 1000 lb and over	2.90
less than 1000 lb	3.05
Tin	.1.075
Molybdenum: 99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.50
less than 200 lb	2.75
82-88%, freight allowed, 2000 lb and over	2.40
less than 2000 lb	2.45
Chromium, electrolytic, 99% Cr min.	3.50

METALLURGICAL COKE

Price per Net Ton

BEEHIVE OVENS

Connellsvll, fur. $13.00-13.50
Connellsvll, fdry..15.00-16.00
New River, foundry....18.00
Wise county, foundry..15.35
Wise county, furnace..14.60

OVEN FOUNDRY COKE

Kearny, N. J., ovens..$22.00
Everett, Mass., ovens .. New England, del.‡..22.70
Chicago, ovens 20.00
Chicago, del. .....†21.45
Detroit, del. 23.91
Terre Haute, ovens....20.20
Milwaukee, ovens 20.75
Indianapolis, ovens 19.85
Chicago, del. 23.32
Cincinnati, del. 22.77
Detroit, del. 23.75
Ironton, O., ovens 19.40
Cincinnati, del. 21.63
Painesville, O., ovens..20.90
Buffalo, del. 23.02
Cleveland, del. 22.62
Erie, del. 21.04
Birmingham, ovens 17.70
Philadelphia, ovens 20.45
Swedeland, Pa., ovens.20.40
Portsmouth, O., ovens.19.50
Detroit, ovens 20.65
Detroit, del. *21.70
Buffalo, del. 22.95
Flint, del. 23.00
Pontiac, del. 21.98
Saginaw, del. 23.30

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.03 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city)	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try)	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)	5.90	6.49	6.88	5.65	...	5.65	6.21	8.10	5.35	5.60	6.80
Phila. (c'try)	5.65	6.24	6.63	5.40	...	5.40	5.96	7.85	5.10	5.35	6.55
Balt. (city)	5.46	6.36	6.81	5.52	...	5.57	6.05	...	5.51	5.71	7.16
Balt. (c'try)	5.31	6.21	6.66	5.37	...	5.42	5.91	...	5.36	5.56	7.01
Norfolk, Va.	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse)	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (W'hse)	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse)	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse)	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse)	5.27‡	5.94**	6.83	5.39	6.10	5.44	5.95	...	5.44	5.64	7.05
Chicago (city)	5.05	5.95[4]	7.05	5.05	6.35-6.85	5.10	5.60	7.90[5]	5.10	5.30	6.75
Chicago (w'hse)	4.85	5.75[4]	6.85	4.85	6.15-6.65	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee(city)	5.18	6.08[4]	7.18	5.18	6.48-6.98	5.23	5.78	8.03[5]	5.23	5.43	6.88
Milwau. (c'try)	5.03	5.93[4]	7.03	5.03	6.33-6.83	5.08	5.63	7.88[5]	5.08	5.28	6.73
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[6]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[6]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.05	6.59	...	5.05	5.25	7.74
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.90	...	...	4.90	5.10	...
Omaha, Nebr.	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	5.60	7.15	7.60	6.10	7.75	5.75	7.40	...	5.60	5.65	7.90
L. A. (w'hse)	5.45	7.00	7.45	5.95	7.60	5.60	7.25	...	5.45	5.50	7.75
San Francisco	6.15[10]	7.50[3]	7.80	6.75[10]	8.25[3]	5.90[10]	7.55	10.85[2]	5.90	6.35	8.10
Seattle-Tacoma	6.70‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.10	6.00[7]	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; ** 17 gage; †† as annealed. Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa. $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

LADLE BRICK

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., Otawa, Ill., $90; Beach Creek, Pa., $80.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Bellmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	18.50

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid. 81.8c-83.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$35.00
48% 3:1	37.50
48% no ratio	28.50-29.00

South African Transvaal

44% no ratio	$19.00-20.00
45% no ratio	19.50-21.00
48% no ratio	27.00-28.00
50% no ratio	28.50-29.00

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	28.00-29.00
48% 3:1 lump	37.50

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolitic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c, 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

Chromium Alloys

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 145)

Tin Prices Continue To Decline

RFC lowers its selling price to basis of 78.75c for Grade A metal in surprise move. Bronze ingot prices also move lower. Copper, lead and zinc hold steady

New York — Price movements in nonferrous metal markets continue to be restricted to those affecting primary tin and alloys containing large percentages of that metal. Copper, lead and zinc prices have been stabilized at present levels.

Action by the Reconstruction Finance Corp. in reducing its selling prices for tin ¼-cent to 78.75c, New York, effective Dec. 14, took the trade by surprise. Reports from Singapore and London earlier in the week had indicated a firmer tendency in those centers after several weeks of steadily declining prices. The British Ministry of Supply has been making orderly releases from its stocks, which are still estimated to be around or slightly under 30,000 long tons of refined tin.

Supplies available on the world markets are ample for all nearby needs. Production of tin in ore in Malaya during October amounted to 4905 tons compared with 5667 tons in September and 4011 tons in the like 1948 month. Production for the first 10 months was 45,381 tons against 36,395 tons for the like 1948 period and only 20,353 for the first 10 months of 1947.

Office of Domestic Commerce, Washington, reports that total receipts in November amounted to 7881 tons compared with 10,188 tons in October, making the total for the first 11 months 90,100 tons, or in excess of the 1948 total of 85,631 tons. Of last month's receipts, 2994 tons were smelter output and 4887 tons imports. At the same time, allocations amounted to only 3148 tons, making the total for the first 11 months 38,769 tons against 57,638 tons in the like period a year ago. Stocks at the end of November came to 23,129 tons after estimated transfer of some 52,000 tons to the permanent stockpile between Jan. 1 and Nov. 30, 1949.

Brass and Bronze Ingots — Brass and bronze ingots having a high tin content have been reduced in price ½-cent to 3 cents a pound, the amount of the reduction depending on the percentage of tin content in the ingot.

Copper — November shipments of refined copper to domestic consumers totaled 118,146 tons, the best monthly deliveries since March, 1948, when domestic makers of copper goods received 122,988 tons, reports the Copper Institute. Shipments of refined copper by producers and custom smelters to American industry in November were 9954 tons higher than the deliveries of 108,192 tons during October.

Stocks of refined copper held by producers which had reached a postwar high of 217,167 tons at the end of August were down to 139,285 tons at the end of November. During November alone, the decrease in stocks amounted to 25,179 tons.

The figures do not include government acquisitions of the metal for the permanent stockpile. If such shipments were included, it is estimated that November total deliveries would be around 128,000 tons and the October figure around 124,000 tons.

Output of crude copper from primary sources increased about 5000 tons to a total of 67,675 tons while output from secondary sources more than doubled, rising to a total of 13,103 tons. The combined totals show an increase of about 11,700 tons over the previous month. Refineries produced a total of 92,688 tons of refined metal, an increase of nearly 6000 tons over the preceding month and bringing the level of output back to about where it was last June.

Indications now are that January deliveries again will be large. Producers are beginning to curtail their bookings for that month, some having disposed of practically all of the metal that will be available in January.

The government has been reported as having made arrangements for the first half of 1950 copper stockpile requirements. It is estimated here that these purchases will average about 10,000 tons a month, or about the same as is believed to have been absorbed each month in 1949. Meanwhile, the allocation of ECA funds to European countries for copper buying already has resulted in improved foreign demand.

Lead—Undertone of the domestic lead market continues strong. This is based largely on the fact that consumers' stocks have been reduced to the minimum safe working level. It is believed that many of them will be forced to reenter the market for substantial tonnages soon.

The government has placed orders for an estimated 80,000 tons of lead to be delivered during the first half of 1950. Some additional lead tonnages have been bought by the government for current shipment, which would bring 1949 stockpile deliveries to an estimated 210,000 tons.

Zinc—Volume of orders for prime western zinc continue light with prices holding at 9.75c, East St. Louis. Supply of Special High Grade zinc remains extremely scarce, with no prospects of improvement over the immediate future. This is attributed in part to the fact that the Bunker Hill refinery is operating at only about 50 per cent of capacity while the New Jersey Zinc Co.'s Palmerton plant is strike-bound.

Lead Output Drops 6 Per Cent

Washington—Average daily rate of lead output from domestic mines in October dropped 6 per cent from the September level, reports the Bureau of Mines. October lead production, in terms of recoverable metal, was 29,779 short tons, an average of 961 tons per day compared with 30,534 tons in September produced at an average rate of 1018 tons per day. Lead output in October was the smallest since September, 1948.

The Bunker Hill smelter at Kellogg, Idaho remained strikebound throughout October resulting in additional work stoppages at mines in the Coeur d'Alene region. Since closing of the smelter on August 20, 1949, Idaho lead output has declined to approximately one-third the monthly average production during the first half of 1949. October lead production in other western states compared with the monthly average production in the first half of 1949 indicates increases in Arizona, Colorado, and Washington. The outputs in California and Montana in October, while greater than those in September, continued to be smaller than the average monthly rate from January through June, 1949.

Kaiser Offers New Wire Items

Oakland, Calif.—Kaiser Aluminum & Chemical Sales Inc. is offering ⅜-in. redraw rod and round-drawn wire. Manufacture of these products follows the further development of facilities at the firm's plant at Newark, O.

Both redraw rod and round-drawn wire are being produced in the following aluminum alloys: 2S, 3S, 52S, 61S, 43S, and 150S. The finishing characteristics of rod and wire of 150S, the new Kaiser alloy first introduced in sheet form several months ago, will be of especial interest to manufacturers of products and parts where fine appearance is desirable.

Redraw rod is available in both annealed and as fabricated tempers (O and F), with the standard coil weighing 220 lb and of the following dimensions: 38 in. ID, 48 in. OD and 11 in. in width.

Round-drawn wire is supplied in coils in standard tempers in size ranges between 0.051 and 0.250. Standard coils are of 22 in. ID and weigh from 55 to 75 lb. Wire may also be wound on customer's spools, if they are adapted to use on the plant equipment.

Metal Castings Shipments Gain

Washington — Average daily shipments, in September, of the types of nonferrous castings reported to the Bureau of the Census were 16 per cent above those reported in August. Total shipments amounted to 126 million pounds in September compared with 119 million pounds in August. The September total included 60.8 million pounds of copper and copper-base alloy castings, 27.6 million pounds of aluminum castings, 35.6 million pounds of zinc castings, 0.7 million pounds of magnesium castings, and 1.3 million pounds of lead die castings. With the exception of magnesium castings, shipments of all types were above the August levels.

At the end of September, unfilled orders for these selected nonferrous castings amounted to 105.2 million pounds, about the same as at the end of August but less than half the quantity on order at the end of September, 1948.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley, Lake, 18.62½c, Conn. Valley.
Brass Ingot: 85-5-5-5 (No. 115) 16.75-18.25c; 80-10-2 (No. 215) 25.25c; 80-10-10 (No. 305) 23.75c; No. 1 yellow (No. 405) 14.25-16.00c.
Zinc: Prime western 9.75c, brass special 10.00c, intermediate 10.25c, East St. Louis; high grade 10.75c, delivered.
Lead: Common 11.80c; chemical, 11.90c; corroding, 11.90c, St. Louis.
Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.
Secondary Aluminum: Piston alloys 16.50-17.00c; No. 12 foundry alloy (No. 2 grade) 16.25-16.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 18.00-18.25c; grade 2, 17.50-17.75c; grade 3, 16.00-16.25c; grade 4, 15.50-15.75c. Prices include freight at carload rate up to 75 cents per 100 lb.
Sheet, titanium-aluminum alloy No. 1 (low Cu) 27.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.
Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.
Tin: Grade A, prompt delivery, 78.75c; December arrival 78.25c; January arrival, 75.75c; February arrival, 75.00c; March arrival, 74.25c. Chinese, 99% tin, prompt del., 72.50c.
RFC selling prices for prompt delivery, ex-dock New York or f.o.b. Texas City, Tex.: Grade A, 99.8% or higher (including Straits) 78.75c.
Antimony: American 99-99.8% and over but not meeting specifications below, 32.00c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 32.50c; f.o.b. Laredo, Tex., or bulk shipments. Foreign, 99% (Chinese, English, Belgium), prompt, 26.00c, New York.
Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 50.50c. Prices include import duty.
Mercury: Open market, spot, New York $71-74 per 76-lb flask.
Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.
Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.
Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.
Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 73.25c per oz.
Platinum: $69-72 per ounce.
Palladium: $24 per troy ounce.
Iridium: $100-$110 per troy ounce.
Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95% 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.
Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.
Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.
Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.
Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 23.30 l.c.l. 23.925, c.l. 23.425; weatherproof, f.o.b. eastern mills, 100,000 lb lots 25.35, l.c.l. 26.10, c.l. 25.60; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4,		——Hexagonal——	
	17S-T4	R317-T4	17S-T4	
0.125	**48.0**	...	...	
0.156-0.203	**41.0**	...	...	
0.219-0.313	38.0	...	...	
0.344	37.0	...	47.0	
0.375	36.5	45.5	44.0	
0.406	36.5	...	...	
0.438	36.5	45.5	44.0	
0.469	36.5	...	...	
0.500	36.5	45.5	44.0	
0.531	36.5	...	...	
0.563	36.5	...	41.5	
0.594	36.5	...	...	
0.625	36.5	43.0	41.5	
0.656	36.5	...	...	
0.688	36.5	...	41.5	
0.750-1.000	35.5	40.5	39.0	
1.063	35.5	...	37.5	
1.125-1.500	34.5	39.0	37.5	
1.563	34.5	...	36.5	
1.625	33.5	...	36.5	
1.688-2.000	33.5	...	...	
2.125-2.500	32.5	...	...	
2.625-3.375	31.5	...	...	

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $17.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $17.00 per cwt. Traps and bends: List price plus 45%.

ZINC

Sheets, 15.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.00c; over 12-in., 15.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.
Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.
Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c f.o.b. Niagara Falls, N. Y.
Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.
Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.
Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb. 59.00c; 100 to 500 lb, 61.00; under 100 lb, 64.00c; f.o.b. Cleveland.
Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbls, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.
Tin Anodes: Bar, 1000 lb and over, 111.00c, 500 to 999 lb, 111.50c; 200 to 499 lb 112.00c; less than 200 lb, 113.50c; ball, 1000 lb and over, 113.25c; 500 to 999 lb, 113.75c; 200 to 499 lb. 114.25c; less than 200 lb, 115.75c f.o.b. Sewaren, N. J.
Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 67.9c; 100 or 300 lb drums only, 100 to 500 lb, 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb 59.7c; 600 to 1900 lb, 57.3c; 2000 to 9900 lb, 55.5c; 10,000 lb and over, 54.4c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.
Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c, f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.
Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 96.00c; more than 2000 lb, 94.00c, f.o.b. Carteret, N. J.
Stannous Chloride (Anhydrous): In 400 lb bbl, 83.00c; 100 lb kegs 84.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00; No. 2 copper 14.00; light copper 13.00; composition red brass 12.25; radiators 9.25; heavy yellow brass 9.25-9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.00; No. 2 copper 14.00; light copper 13.00; refinery brass (60% copper) per dry copper content 13.00-13.25; radiators 9.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire, No. 1 13.00-13.25, No. 2 12.00-12.25; light copper 11.00-11.25; No. 1 composition red brass 10.50-10.75; No. 1 composition turnings 9.75-10.00; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 7.25-7.50; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.00-8.25; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.
Lead: Heavy 8.75-9.00, battery plates 4.00-4.25; linotype and stereotype 10.00-10.25; electrotype 9.00-9.25; mixed babbitt 9.25-9.50.
Zinc: Old zinc 4.25-4.75; new die cast scrap 4.00-4.50; old die cast scrap 3.00-3.25.
Tin: No. 1 pewter 42.00-42.50; block tin pipe 63.00-63.50, No. 1 babbitt 30.00-30.50.
Aluminum: Clippings 2S 10.50-11.00; old sheets 7.50-8.00, crankcase 7.50-8.00, borings and turnings 3.00-3.50.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Dec. 14-15	18.50	11.80	9.75	78.75	17.00	32.00	40.00	73.25
Dec. 8-13	18.50	11.80	9.75	79.00	17.00	32.00	40.00	73.25
Dec. 5-7	18.50	11.80	9.75	80.75-81.00	17.00	32.00	40.00	73.25
Dec. 2-3	18.50	11.80	9.75	81.00	17.00	32.00	40.00	73.25
Dec. 1	18.50	11.80	9.75	83.00	17.00	32.00	40.00	73.25
Nov. Avg.	18.427	12.348	9.760	89.823	17.00	32.00	40.00	73.25
Nov. 30	18.50	11.80	9.75	83.25	17.00	32.00	40.00	73.25
Nov. 28-29	18.50	11.80	9.75	84.75	17.00	32.00	40.00	73.25
Nov. 21-26	18.50	11.80	9.75	85.00	17.00	32.00	40.00	73.25
Nov. 18-19	18.50	12.30	9.75	85.50	17.00	32.00	40.00	73.25
Nov. 17	18.50	12.30	9.75	90.00	17.00	32.00	40.00	73.25
Nov. 16	18.50	12.30	9.75	92.00	17.00	32.00	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del, New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Dec. 15, 1949; gross tons except as noted
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Dec. 15	$28.25
Dec. 8	28.58
Dec. 1949	28.96
Dec. 1948	43.25
Dec. 1944	18.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$31.00*
No. 2 Heavy Melt.	*28.00-29.00*
No. 1 Busheling	*31.00*
No. 1 Bundles	*31.00*
No. 2 Bundles	*26.00-27.00*
No. 3 Bundles	*24.00-25.00*
Heavy Turnings	24.50-25.00
Machine Shop Turnings	21.00-22.00†
Mixed Borings, Turnings	22.00-23.00†
Short Shovel Turnings	25.00-26.00
Cast Iron Borings	22.50-23.00
Low Phos. Steel	34.50-35.50

Cast Iron Grades*

No. 1 Cupola Cast	35.00-36.00
No. 1 Machinery Cast	39.00-40.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	27.00-28.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	33.50-34.00
Axles	36.00-37.00
Rails, Random Length	36.00-37.00
Rails, 2 ft. and under	40.00-41.00
Rails, 18 in. and under	41.00-42.00
Railroad Specialties	36.00-37.00
Angles, Splice Bars	34.00-34.50

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$29.50-30.00*
No. 2 Heavy Melt. Steel	*28.00-28.50*
No. 1 Busheling	*29.50-30.00*
No. 1 Bundles	*29.50-30.00*
No. 2 Bundles	23.50
Machine Shop Turnings	*18.50-19.00*
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	20.50-21.00
Cast Iron Borings	20.50-21.00
Bar Crops and Plate	*30.50-31.00*
Punchings & Plate Scrap	32.00-32.50
Cut Structurals	32.00-32.50

Cast Iron Grades

No. 1 Cupola	44.00-45.00
Charging Box Cast	37.00-38.00
Stove Plate	*37.00-38.00*
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	32.50-33.50
Brake Shoes	*30.00-31.00*
Clean Auto Cast	45.00-46.00
No. 1 Wheels	39.00-40.00
Burnt Cast	33.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	43.00-44.00
Rails, 18 in. and under	44.00-45.00
Rails, Random Lengths	38.00-39.00
Cast Steel	35.00-36.00
Railroad Specialties	*36.00-36.50*
Uncut Tires	*37.00-38.00*
Angles, Splice Bars	41.00-42.00

VALLEY

No. 1 Heavy Melt. Steel	*$31.50-32.00*
No. 2 Heavy Melt. Steel	*29.50-30.00*
No. 1 Bundles	*31.50-32.00*
No. 2 Bundles	*24.00-24.50*
Machine Shop Turnings	22.50-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	23.50-24.00
Low Phos.	*32.50-33.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$24.50-25.00
No. 2 Heavy Melt. Steel	23.00-23.50
No. 1 Busheling	23.00-23.50
No. 1 Bundles	25.00
No. 2 Bundles	21.50-22.00*
Machine Shop Turnings	16.50-17.50
Short Shovel Turnings	18.50
Mixed Borings, Turnings	15.50-16.00*
Bar Crop and Plate	27.50-28.50
Punchings & Plate Scrap	27.50-28.50
Cut Structurals	26.00-27.00
Elec. Furnace Bundles	*26.00*
Heavy Turnings	24.00-25.00
No. 1 Chemical Borings	28.00-29.00

Cast Iron Grades

No. 1 Cupola Cast	*35.00*
No. 1 Machinery Cast	37.00-38.00
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	35.00-36.00
Unstripped Motor Blocks	30.00-31.00
Clean Auto Cast	*37.00*
No. 1 Wheels	37.50-38.50
Malleable	39.00

* Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	*$27.00*
No. 2 Heavy Melt. Steel	*25.00*
No. 1 Busheling	*26.00*
No. 1 Bundles	*27.00*
No. 2 Bundles	*20.00*
Machine Shop Turnings	*15.00*
Short Shovel Turnings	*18.00*
Mixed Borings, Turnings	*17.00*
Cast Iron Boring	*18.00*

Cast Iron Grades

No. 1 Cupola Cast	*41.00*
Charging Box Cast	*32.00*
Heavy Breakable Cast	*35.00*
Stove Plate	*30.00*
Unstripped Motor Blocks	22.00
Brake Shoes	*22.00*
Clean Auto Cast	*41.00*
Drop Broken Cast	*43.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*30.00*
R.R. Malleable	*32.00*
Rails, Rerolling	*36.00*
Rails, Random Length	*34.00*
Rails, 18 in. and under	*43.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$25.00-26.00
No. 1 Bundles	29.00-30.00
No. 2 Bundles	25.00-26.00
No. 1 Busheling	28.00-30.00
Machine Shop Turnings	19.00-20.00
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings	21.00-22.00
Cast Iron Borings	21.00-22.00
Punchings & Plate Scrap	28.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Heavy Breakable Cast	32.00-33.00
Clean Auto Cast	36.00-37.00

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	25.50-26.00
Machine Shop Turnings	20.00-20.50
Mixed Borings, Turnings	21.00-21.50
Cast Iron Borings	21.00-21.50
Short Shovelings	22.50-23.00
Low Phos.	31.50-32.00

Cast Iron Grades

No. 1 Machinery	39.50-40.00
No. 1 Cupola	36.00-37.00
Malleable	34.50-35.00

Railroad Scrap

Rails, 2 ft. and under.	38.00-39.00
Scrap rails	35.00-36.00
Specialties	35.00-36.00
No. 1 car wheels	36.00-37.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$21.00*
No. 2 Heavy Melt. Steel	*18.00-19.00*
No. 1 Busheling	*18.00-19.00*
No. 1 Bundles	*21.00*
No. 2 Bundles	*17.00-18.00*
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings.	11.00-12.00
Punchings & Plate Scrap	*21.00-22.00*
Cut Structurals	*21.00-22.00*
Elec. Furnace Bundles	*21.00-22.00*

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery	31.00-32.00
Charging Box Cast	25.00-26.00
Heavy Breakable	25.00-26.00
Unstripped Motor Blocks	26.00
Malleable	36.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$20.00-20.50*
No. 2 Heavy Melt. Steel	*17.00-17.50*
No. 1 Bundles	*20.00-20.50*
No. 1 Busheling	*17.50-18.00*
Machine Shop Turnings	*11.50-12.00*
Mixed Borings, Turnings	*11.50-12.00*
Short Shovel Turnings	*13.50-14.50*
Bar Crops and Plate	22.00-22.50
Punchings & Plate Scrap	22.00-22.50
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	*30.00-33.00*
Mixed Cast	*26.00-27.00*
Heavy Breakable Cast	*27.00-28.00*
Stove Plate	24.00-25.00
Unstripped Motor Blocks	20.00-21.00

CHICAGO

No. 1 Heavy Melt. Steel	$28.00-30.00
No. 2 Heavy Melt. Steel	25.00-26.00
No. 1 Bundles	28.00-30.00
No. 2 Bundles	23.00-24.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	18.00-19.00
Short Shovel Turnings	19.50-20.50
Cast Iron Borings	18.00-19.00
Bar Crops and Plate	30.00-31.00
Punchings	30.00-31.00
Elec. Furnace Bundles	28.00-29.00
Heavy Turnings	23.00-24.00
Cut Structurals	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	*35.00-40.00*
Clean Auto Cast	42.00-43.00
No. 1 Wheels	32.00-33.00
Stove Plate	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00-31.00
Malleable	37.00-38.00
Rails, Rerolling	43.00-44.00
Rails, Random Lengths	36.00-37.00
Rails, 2 ft. and under.	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	32.00-33.00
Angles, Splice Bars	36.00-37.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	24.50
No. 1 Busheling	24.00
No. 2 Bundles	22.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings.	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	30.00
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Stove Plate	28.00-30.00
No. 1 Wheels	23.00-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	28.00
R. R. Malleable	nominal
Rails, Rerolling	37.00
Rails 3 ft. and under	25.00-26.00
Angles and Splice Bars	31.00-33.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	26.00-27.00
Machine Shop Turnings	*16.00-18.00*
Short Shovel Turnings	*20.00-21.00*

Cast Iron Grades

No. 1 Cupola Cast	36.00-37.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	28.00-29.00
Brake Shoes	*30.00-31.00*
Clean Auto Cast	*38.00-39.00*
Burnt Cast	*30.00-31.00*

Railroad Scrap

R.R. Malleable	*29.00-30.00*
Rails, Rerolling	*39.00-40.00*
Rails, Random Lengths	*33.00-34.00*
Rails, 3 ft. and under	*37.00-38.00*
Uncut Tires	29.00-30.00
Angles, Splice Bars	*34.00-36.00*
Railroad Specialties	*31.00-32.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Wheels	20.00
Rails, Random Lengths	20.00

SEATTLE

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	22.00
Cut Structurals	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast	*25.00*
Heavy Breakable Cast.	20.00
Stove Plate	20.00
Unstripped Motor Blocks	18.00
Malleable	20.00
Brake Shoes	18.00
Clean Auto Cast	25.00
No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	19.00
Railroad Malleable	25.00
Rails, Random Lengths	19.00
Angles and Splice Bars	19.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	*25.00*

Cast Iron Grades

No. 1 Cupola Cast	*28.00-30.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	32.00

HAMILTON, ONT.

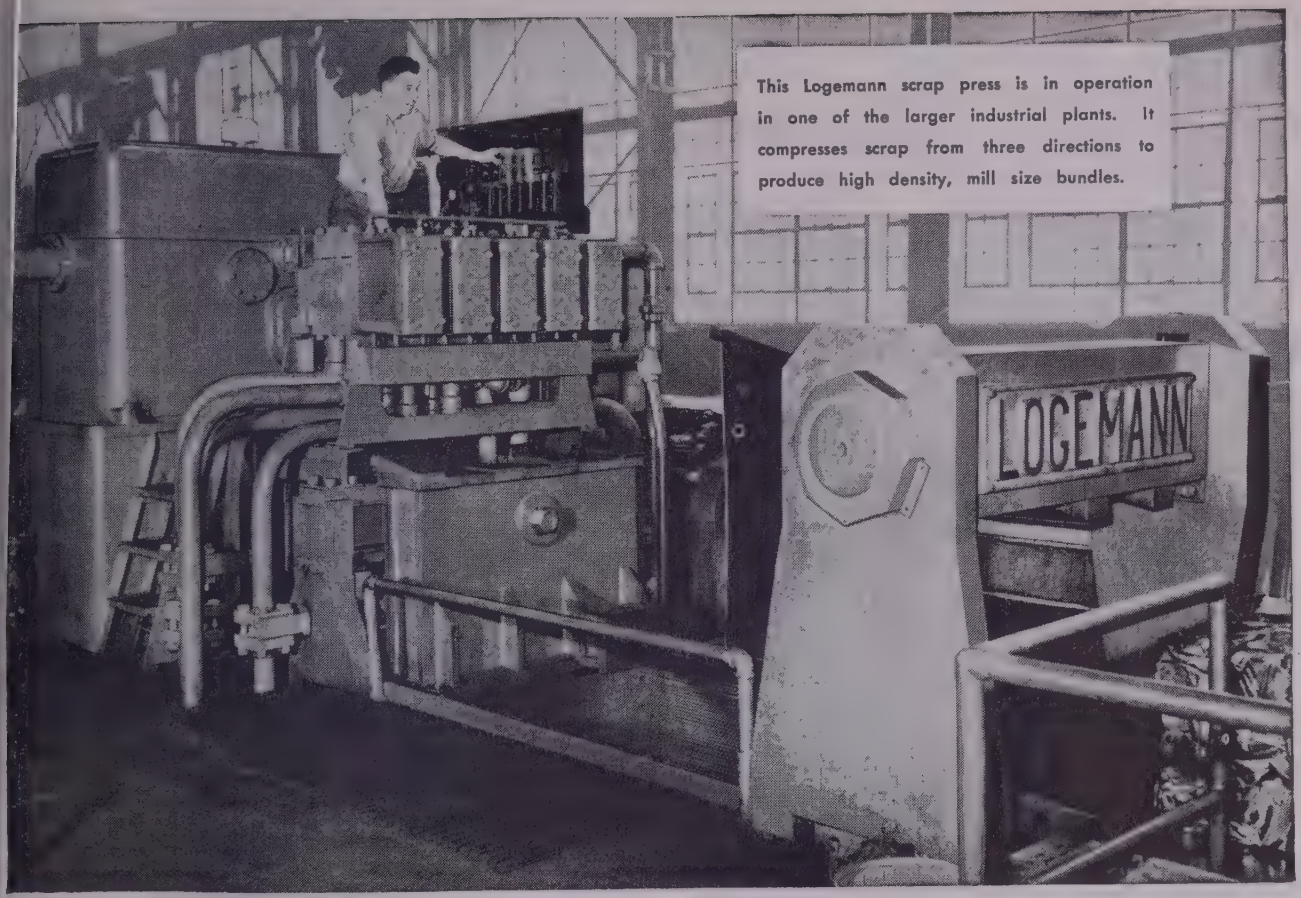
(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.00
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades*

Cast	40.00-43.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



This Logemann scrap press is in operation in one of the larger industrial plants. It compresses scrap from three directions to produce high density, mill size bundles.

Self-contained.....
Triple Compression..
Automatically Controlled

LOGEMANN SCRAP PRESSES

handle high tonnages with minimum labor . . . at low cost!

LOGEMANN METAL BALERS

. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

The compact unit illustrated is completely self-contained with oil tank and pump located directly over the press . . . utilizing the advantages of short pipe lines. Automatic controls, mounted in front of pump, give the operator full visibility at all times. Controls operate rams successively within a single rigid box. There is no complex construction which means there is *no need for specially-trained maintenance crews.*

Both two-ram and three-ram models are available with automatic controls or for manual manipulation.

Logemann Bros. Co. have specialized in the production of scrap metal presses for sheet mills, stamping plants, scrap yards, and metal manufacturing plants of all types for nearly 75 years. Write for full information—please state the nature of your scrap and tonnage.

LOGEMANN BROTHERS COMPANY
3164 W. Burleigh Street • Milwaukee 10, Wisconsin

Improved quality control of metals at **LOWER COST**

SPERRY ULTRASONIC REFLECTOSCOPE

Reflectoscope, Type UR, Style 50E351.

Provides rapid accurate non-destructive testing of steel and other metals

Metals tested by the Reflectoscope are preferred by users who cannot afford lost machine and man hours. The expense of lost work on faulty metals and possibility of service failures are minimized when potentially harmful defects are located before fabricating or machining.

The cost per test is low because it is instantaneous. The operator touches the quartz-crystal Searching Unit to the surface and immediately "sees" through the metal. Discontinuities are revealed on the Reflectoscope screen and are located accurately. For full details write for new Bulletin 50-105.

- CONTROLLED SENSITIVITY —can be adjusted to meet quality control standards.
- PORTABLE UNIT — can be set-up quickly by one man.
- TESTS PARTS "IN PLACE" —locates fatigue cracks in shafts, rolls, axles and other stressed parts. Operates on 100-130 volt, 60 cycle current.

SPERRY REFLECTOGAGE. Measures thickness of metals and other materials by resonance at ultrasonic frequencies. Accuracy within 2%. Full details in Bulletin 3700.

SPERRY PRODUCTS, INC.
DANBURY, CONN.

Sperry

SP-159

(*Continued from Page* 132)

	Annealed	Gal.	(Inc.)
Wire, merchant quality:			
Donora, Cleve., Joliet Duluth, Rankin ..	5.15	5.60	0.35
Worcester	5.45	5.90	0.35
Wire, Barbed:			
Donora, Rankin, Joliet, Duluth	Col.	126	3
Woven Fence:			
Donora, Joliet, Rankin, Duluth	Col.	116	7
Bale Ties:			
Donora, Joliet, Duluth	Col	113	7

TENNESSEE COAL, IRON & RAILROAD CO.

	(Per Net Ton)	(Inc.)
Billets, blooms and slabs		
Rerolling	$53.00	1.00
Forging	63.00	2.00
	(Per 100 Lb)	
Wire rods	$3.85	0.45
Sheets		
Hot-rolled (18 ga. & hvr.)..	3.35	0.10
Cold-reduced	4.10	0.10
Corrugated galv. culvert .. (16 ga., 24" to 30" wide)		
Copper bearing	5.20	0.20
Pure iron	5.45	0.10
Copper bearing pure iron ..	5.45	0.10
Bars and small shapes	3.45	0.10
Reinforcing bars	3.45	0.10
Plates, carbon	3.50	0.10
Standard structurals	3.40	0.15
Standard rails	3.40	0.20
Light rails	3.75	0.20
Splice bars	4.40	0.15
Tie plates	4.20	0.15
Axles	5.25	0.05
Wire		
Bright low-carbon	4.50	0.35
Merchant quality:		
Annealed	5.15	0.35
Galvanized	5.60	0.35
Nails and staples .....Col.	106	3
Barbed wire .....Col.	126	3
Woven fence .....Col.	116	7
Bale ties .....Col.	113	7
Cor-Ten		
Hot-rolled sheets	$ 5.05	0.10
Bars and small shapes	5.20	0.10
Plates	5.35	0.15
Standard structural shapes ..	5.15	0.20

COLUMBIA STEEL CO.

	(Per 100 Lb)	(Inc.)
Structural shapes	$4.00	0.15
Tie plates	4.35	0.15
Bars:		
Hot-rolled	4.15	0.10
Concrete reinforcing	4.15	0.10
Sheets:		
Hot-rolled (18 ga. & hvr.)..	4.05	0.10
Hot-rolled annealed (19 ga. & lgtr.)	5.15	0.10
Corrugated galvanized culvert (16 ga. 24" to 30" wide)		
Copper bearing	5.95	0.20
Cold rolled	5.05	0.10

COLUMBIA STEEL CO.

	(Per 100 Lb)	(Inc.)
Hot-rolled rods		
Pittsburg	$4.50	0.45
Torrance	4.65	0.45
Wire:		
Annealed, merchat	6.10	0.35
Galvanized, merchant	6.55	0.35
Bright basic	5.45	0.35
Annealed stone	9.75	0.35
Galvanized stone	11.25	0.35
M. B. high carbon spring..	6.85	0.35
Premier spring	6.50	0.35
Nails and staples, non stock.	6.30	...
Nails and staples, stock		
Pittsburg .....Col.	125	3
Torrance .....Col.	126	3
Wire:		
Barbed & twisted .....Col.	146	3
Woven wire fence .....Col.	139	7
Single loop bale ties .....Col.	137	7
Steel, high srtength:		
Man-Ten sheets	4.90	0.10

NATIONAL TUBE CO.

	(Inc. per Net Ton)
Butt-Weld:	
Standard and line pipe, ½" to 3".	$5.00
Seamless:	
Standard and line pipe	5.00
Casing, all grades	5.00
Oil well tubing, and drill pipe, all grades	8.00
Carbon and alloy	*
Mechanical and pressure tubing ..	*

* Prices will be adjusted proportionately.

GENEVA STEEL CO.

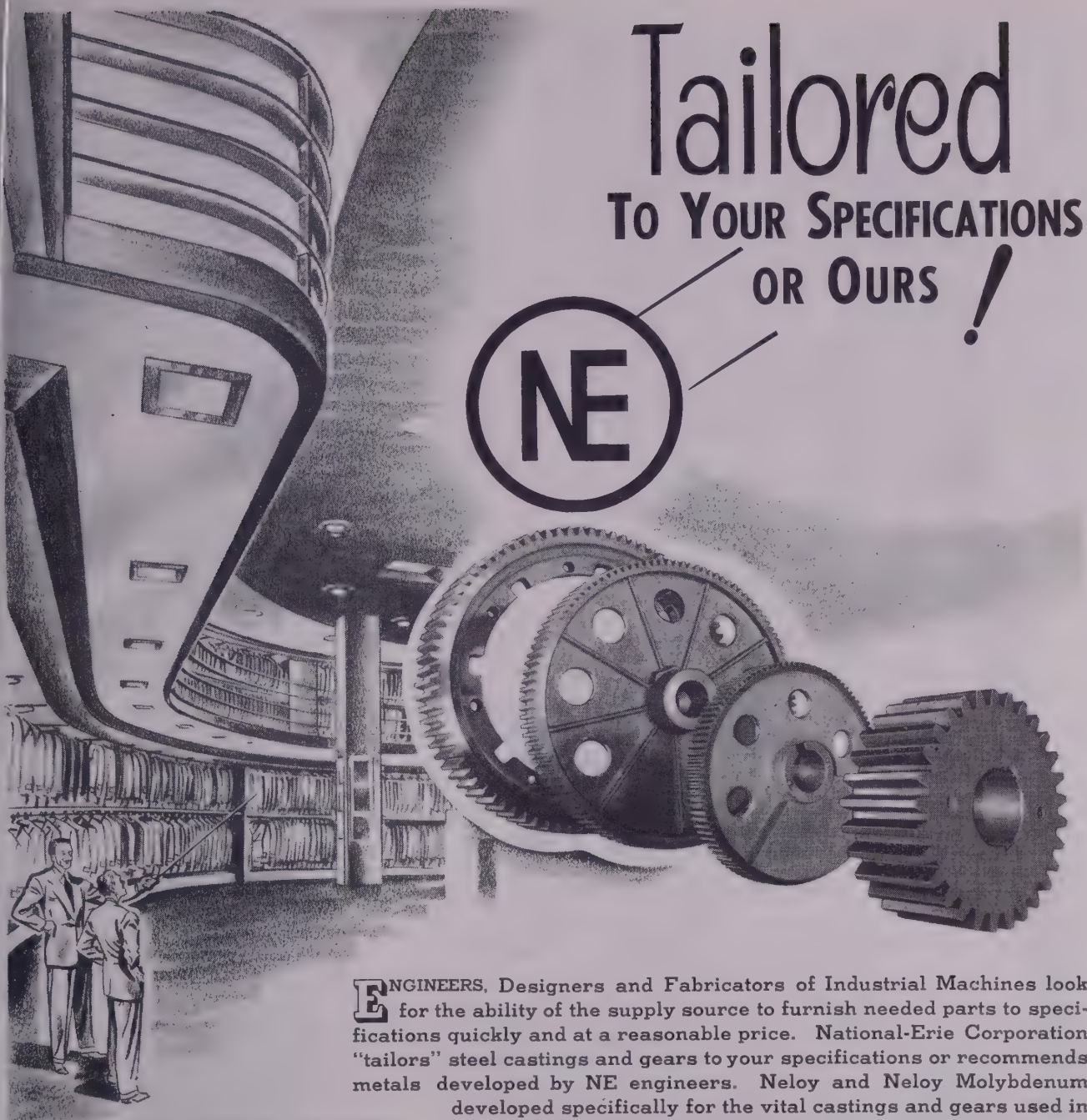
	(Per 100 Lb)	(Inc.)
Carbon Steel		
Plates	$3.50	0.10
Standard structurals	3.40	0.15

(*Please turn to Page* 134)

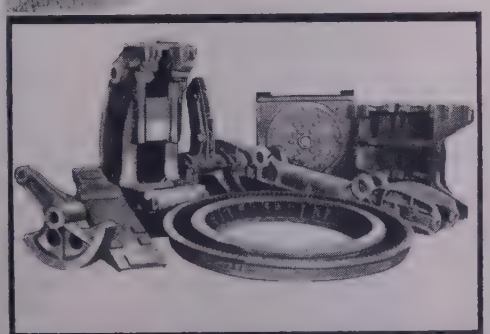
Tailored

To Your Specifications or Ours!

NE



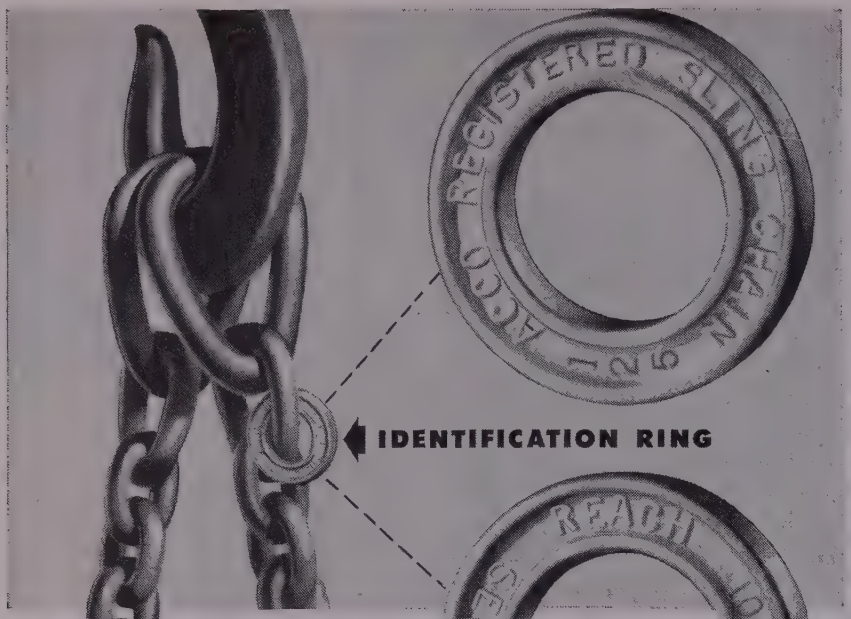
ENGINEERS, Designers and Fabricators of Industrial Machines look for the ability of the supply source to furnish needed parts to specifications quickly and at a reasonable price. National-Erie Corporation "tailors" steel castings and gears to your specifications or recommends metals developed by NE engineers. Neloy and Neloy Molybdenum developed specifically for the vital castings and gears used in industrial machines, are specified by many designing engineers because parts made of these materials last longer and costs less in the long run. Coupled with outstanding successful performance in service, these parts are deliverable as rough castings, machined or finish machined and heat treated gears and castings to your specifications. It will pay you to consult with National-Erie Corporation when selecting your supply source for industrial castings and gears rough or finish machined and heat treated. Send for bulletin No. 9.



NATIONAL ERIE CORPORATION

ERIE, PENNSYLVANIA • U. S. A.

NE



This drop-forged ring is permanently attached to each ACCO Registered Sling Chain. All essential identifying information shown on both sides of Ring, as illustrated, protected by outer flange.

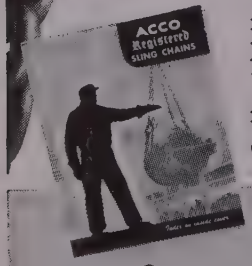
Certified

BY AMERICAN CHAIN

"The Nation's Chainmaker"

We believe that the best way to build safety into Sling Chains is to make each one individually—to inspect it and test it as though it were made to special order.

From that belief came the idea of ACCO Registered Sling Chains. Each sling chain made by AMERICAN CHAIN is Registered. Each one carries a Certificate of Test and Warranty. Every one is identified by a permanent metal ring on which is stamped all essential identifying information.



SEND for this catalog which contains information on how to select, use and care for sling chains. It is DH-80.

ACCO

York, Pa., Chicago, Denver, Detroit, Pittsburgh, Portland, San Francisco, Los Angeles, New York, Philadelphia Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

High Strength Steel		
Corten		
Plates	5.35	0.15
Man-Ten		
Plates	4.55	0.10
Abrasion Resisting		
Plates	4.65	...

Tin Plate Prices Drop

Reductions were effected in electrolytic and hot dipped tin plate, new prices effective Jan. 1, and applicable for all of 1950. Prices issued by three U. S. Steel subsidiaries producing these products, Carnegie-Illinois Steel Corp., Columbia Steel Co., and Tennessee Coal, Iron & Railroad Co. vary somewhat, but the reductions are uniform. On electrolytic plate they are: 10 cents per base box on 0.25 lb coating, 10 cents on 0.50 lb coating and 15 cents on 0.75 lb coating. Hot dipped tin plate was reduced 20 cents per base box on 1.25 lb coating and 25 cents on 1.50 lb coating. The lower prices reflect recent sharp reductions in the price of pig tin.

CARNEGIE-ILLINOIS STEEL CORP.
Irvin, Pa. & Gary, Ind.
Electrolytic Tin Plate
(Per Base Box)

Coating	Price	Decrease
0.25 lb	$6.35	.10
0.50 lb	6.60	.10
0.75 lb	6.85	.15

Hot Dipped Tin Plate
(Per Base Box)

Coating	Price	Decrease
1.25 lb	$7.30	.20
1.50 lb	7.50	.25

Canmaking Quality Black Plate

55 to 128 lb basis weight	$5.60	.15
Special coated Mfg. ternes	$6.50	.15

TENNESSEE COAL, IRON & RAILROAD CO.
Fairfield, Ala.
Electrolytic Tin Plate
(Per Base Box)

Coating	Price	Decrease
0.25 lb	$6.45	.10
0.50 lb	6.70	.10
0.75 lb	6.95	.15

Hot Dipped Tin Plate

Coating	Price	Decrease
1.25 lb	$7.40	.20
1.50 lb	7.60	.25

Canmaking Black Plate

55-128 lb basis weight	$5.70	.15
Special coated Mfg. ternes	6.60	.15

COLUMBIA STEEL CO.
Pittsburg, Calif.
Electrolytic Tin Plate
(Per Base Box)

Coating	Price	Decrease
0.25 lb	$7.10	.10
0.50 lb	7.35	.10
0.75 lb	7.60	.10

Hot Dipped Tin Plate
(Per Base Box)

Coating	Price	Decrease
1.25 lb	$8.05	.20
1.50 lb	8.25	.25
Canmaking black plate	6.35	.15

Sheets Strip . . .

Sheet and Strip Prices, Page 123 & 124 & 125

New York—Strong pressure for sheets continues. Consumers are not only pressing for tonnage already on order, but are still endeavoring to place new contracts, even though extended deliveries are involved. Some producers are booked through the first half; others are booked only through the end of the first quarter, but could readily book tonnage well beyond were they so disposed. This applies to hot and cold-rolled and galvanized sheets and enameling stock.

Philadelphia — While some sheet mills are booked throughout the first half on major grades, with much of first quarter tonnage likely to represent carryover from this year, others have refused to open books for the

second quarter. They wish first to obtain a better view of the outlook with regard not only to demand but also operating conditions, particularly as they may be influenced by labor developments in coal.

Pittsburgh—Sellers note continued heavy pressure for prompt deliveries of old orders held up by the steel strike. Some interests are booked into second quarter on galvanized and cold-rolled sheets, although most producers have refused to make commitments that far in advance.

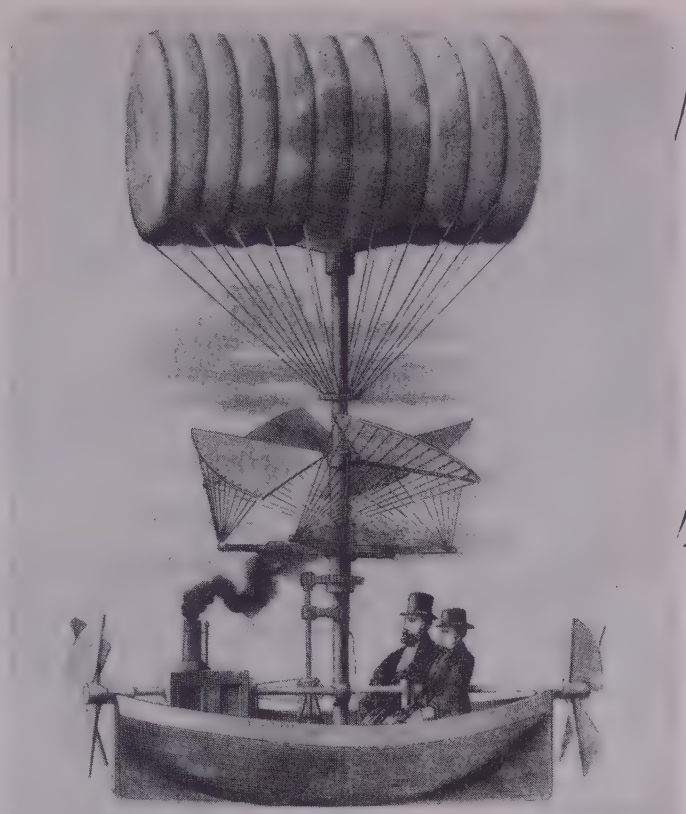
Cleveland—Situation in the flat-rolled steel market is tighter. Buyers continue to press tonnage on the mills whose order backlogs could be built extending into third quarter, if producers were willing to accept tonnage that far ahead. Republic Steel Corp. booked through first half and is turning down business beyond June. Some district sellers have not yet opened books for second quarter. Meanwhile, rolling mills in this area have been approached by consumers to handle conversion tonnage. Conversion business, however, has not attained the proportions some observers had predicted immediately following the strike. Buyers are hesitant about paying premium prices in face of uncertain conditions in the new year. Gray market offerings are not being gobbled up. One gray market operator in this area is meeting with difficulty in disposing of 80 tons of cold-rolled sheets at $10 per ton over the regular warehouse market.

Cincinnati—Sheet demand continues strong, as indicated by steady pressure for early deliveries and ordering for first quarter. Schedules will be overloaded in the next three months, due mainly to carryovers accumlated during the steel strike.

Chicago—Under strict allocation by mills, flat-rolled carbon products probably will be shipped in close accordance with promises. Indications are that little material will be in arrears at year end despite the loaded condition of books for first quarter and beyond. One mill, for example, has been scrupulously careful to avoid overbooking because of the serious disruptions encountered when steel shipments fail to go out on promise. They reason that consumers' production schedules can be better predicated on known delivery dates with less tonnage than if they promise but fail to deliver larger tonnages.

There are some significant exceptions to the general rule of good promises. A crane maker here has been put on very short steel rations by a mill's failure to deliver on time and is desperately trying to meet production requirements with steel scraps. This company anticipates difficulty through next quarter.

St. Louis—Cold-rolled sheets, roofing and tin plate continue as the items in liveliest demand here and mill executives are holding second quarter books closed as long as possible in the hope allocations won't have to be reimposed. It appears inevitable now, with proffered orders already topping mill capacity by 50 per cent. Granite City Steel Co. last week made its first tap from a new and fourth 180-ton open hearth added to its former DPC plant. That



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This novel invention by one Henry Badgley of Virginia was intended for "aerial navigation." The "motor" was supposed to turn propeller wheels at opposite ends of the boat to move it either forward or backward, and also turn a horizontal propeller wheel to help the balloon raise the boat.

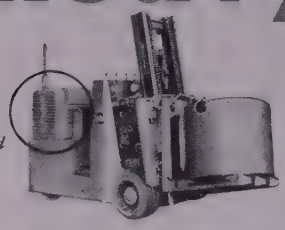
The Bettman Archive

While Henry Badgley's conception of an aerial machine never reached the stage of mass production, his contribution to the development of power transmission machinery deserves passing tribute.

On the other hand, *practical* solutions to problems of power transmission have been the main concern of the Twin Disc Clutch Company over the past 31 years. In the construction, lumber, petroleum, farm equipment, marine and machine tool fields—wherever power must be applied—Twin Disc has engineered an answer to every problem.

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
(Hydraulic Division, Rockford, Illinois).

heavy loads need READY-POWER



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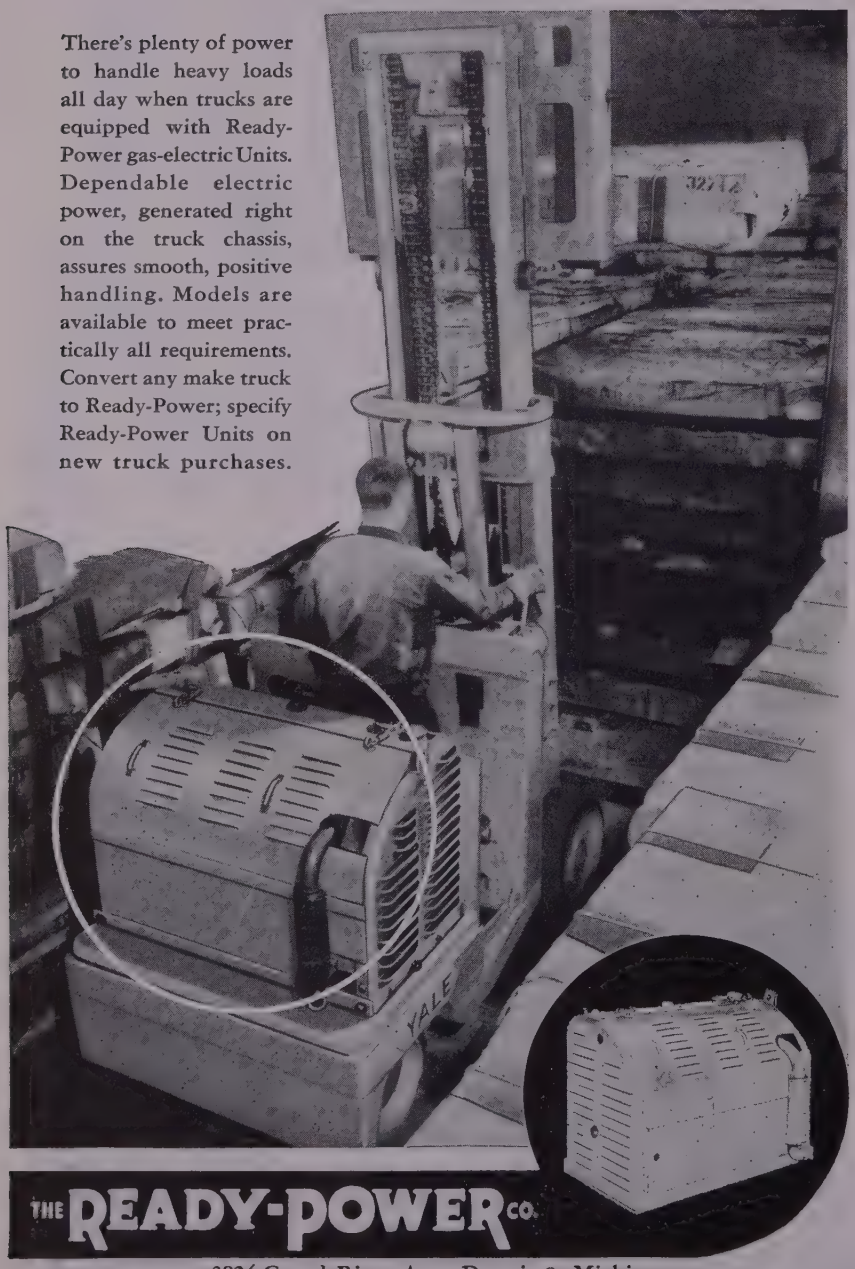

THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

raises its total of furnaces to 1 some of which are high-cost uni not regularly operated.

Birmingham — Sheet output is capacity as ingot is flowing mo freely to the various manufacturin departments. Demand for most she items continues strong and in exce of ability of mills to meet. Str production, except for barrel hoop has tapered.

Los Angeles— Sheet and strip d mand is strong, with galvanize especially tight. Most auto assembl plants are feeling the pinch, bu only Nash Motors at El Segund Calif., has actually suspended opera tions.

San Francisco—Pick-up in busines being felt by many flat-rolled stee users, including manufacturers o furnaces, stoves and water heaters i accentuating demand for sheets whic are in extremely scarce supply.

Steel Bars . . .

Bar Prices, Page 123

New York—Broadening in demand for hot carbon bars is reflected i somewhat more extended mill de livery schedules. One eastern pro ducer is booked through the first two months of next year on the smaller sizes; others indicate that they have little in any size under six to seven weeks. Demand is diversified with greatest interest being shown by builders of machine tools and small tool equipment. Cold-rolled carbon bars can still be had for nearby ship ment on most sizes, as most cold drawers have fairly balanced stocks on hand. Where stock is not on hand, deliveries extend two months in some cases.

Philadelphia — Deliveries on hot carbon bars have been extended slightly, but average a little more than five to six weeks with most producers, depending upon the specifications. Flats and small rounds are among the tighter items. Meanwhile, foreign bessemer stock is being offered more freely and at prices under the domestic market. For instance, ⅜-in. rounds (ASTM specification A-7 Bessemer) are quoted 3.75c, c.i.f. Atlantic and Gulf ports, comparable to about 4.65c, domestic mill. In 20-ton lots, flats ¼-in. x 2¾ in., are offered at 3.50c, c.i.f. Atlantic ports.

Cleveland—Mills will enter the new year with substantial order backlogs in carbon bars, but they still have openings in late first quarter rolling schedules. Alloy and cold-finished bars are more freely available than carbon. Holiday influences are a factor, exerting a check on market activity.

Chicago—Cold-drawers say business is just "so-so." It has been both better and far worse this year and now seems to be holding stable in a market where some sizes and analyses are available immediately from makers' stocks while others require four to six weeks or longer for shipment. Approximately the same schedules apply on alloy as on carbon, neither now showing much evidence of the strike. On hot-rolled bars, a considerable amount of carryover into January will be necessary by one mill, this interest apparently

having allowed itself to oversell while making inadequate allowance for the firmness of prestrike bookings. The bombshell of U. S. Steel's price announcement caught bar sellers by surprise, but they are frank to admit that many of their extras were completely unrelated to costs and badly in need of change.

Calumet Steel Division of Borg-Warner was still strike-bound late last week.

Los Angeles—Bar picture in this district is extremely spotty. Some producers are offering December deliveries; others are booked into February. Competition is increasingly severe, and consumers are buying hand-to-mouth, with close scrutiny of price and delivery date.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 123

Pittsburgh—Concrete bar sellers expect shipments this year will approximate 1948 volume. They believe less tonnage will be required for private construction next year with the lag from this source made up by increased demand for public projects.

Cleveland—Reinforcing bar demand is seasonally slow. Only small jobs are coming out. Contractors are figuring a large volume of work, however, and bar sellers anticipate a pickup in inquiry after Jan. 1. The building outlook for 1950 is considered promising. Prospects are brightened considerably by the large number of public building projects, chiefly schools, approved in Ohio at the last election.

Seattle — Northwest Steel Rolling Mills Inc., Seattle, will resume rolling after a temporary shutdown. Bethlehem Pacific Coast Steel Corp.'s local plant is on a 40 per cent basis at present. Backlogs have been drastically reduced in the last quarter, but considerable business extends into the new year.

Structural Shapes . . .

Structural Shape Prices, Page 123

New York—Structural activity reflects seasonal lull, although substantial work is in prospect for after Jan. 1. One of the largest active projects at the moment is the Massachusetts Life Insurance building, involving 4000 tons. Foundation work in connection with the South Side Elevated highway is expected to be figured in the near future, with the superstructure, involving approximately 18,000 tons, likely to become active in May.

Philadelphia — Current structural buying is light, although an increasing amount of work is being figured. Most important active project is a local veterans hospital, involving 2800 tons. Standard shapes can be obtained for January delivery; wide flange sections, by late February or early March.

Pittsburgh—Growing competitive conditions within structural fabricating industry is reflected in substantial reductions in bids on limited amount of work being awarded. Private expansion programs are practically dormant, but fabricators are hopeful public jobs will offset this

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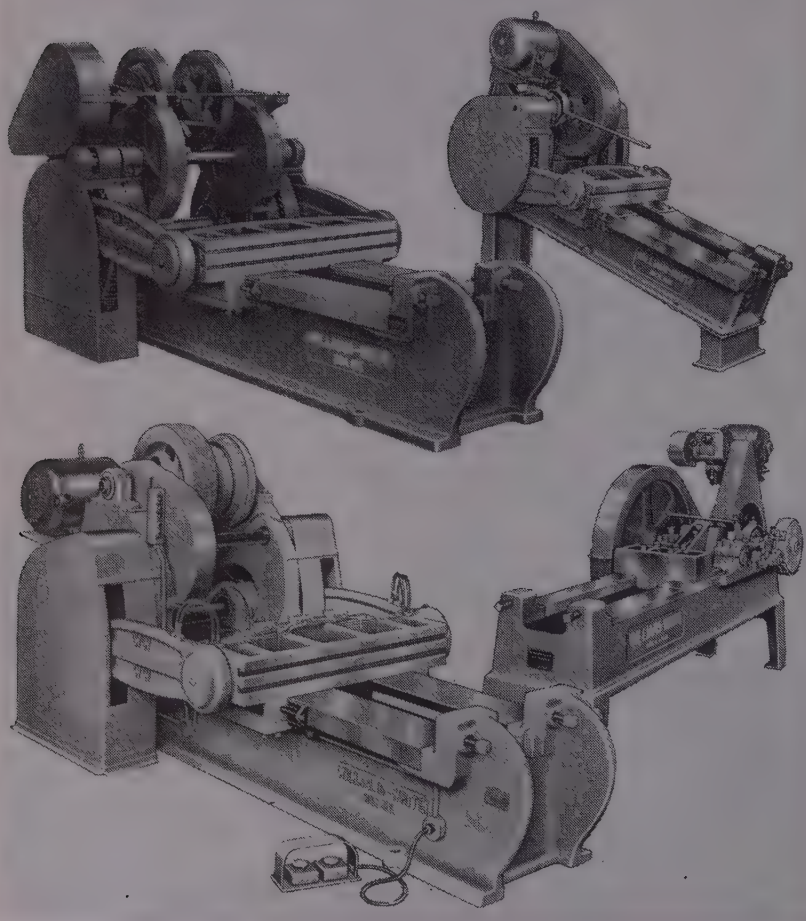

THE Mechanical Bulldozers shown above are representative of a complete line of these popular horizontal presses built by WILLIAMS-WHITE & CO.

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condition over coming months. Some fabricators have raised escalator price clause provision in bidding on new jobs because of pending advance in steel prices. Mill deliveries on wide flange beams are extended into March, but January openings in rolling schedules are noted for standard structural sections.

Cleveland — Standard shapes are available for fairly early shipment, but wide flange section deliveries extend beyond 10 weeks. Currently, structural activity is seasonally slow.

Birmingham — Fabricating plants are on reasonably busy schedules and shape production is correspondingly steady. Most items are for relatively small tonnages since major construction has slacked probably until spring when several sizable jobs may be placed.

Los Angeles—Conditions are more competitive than at any time this year. Although considerable work is coming up, including several large jobs, most of the current projects involve small tonnages. Even the major fabricators are bidding on these small miscellaneous jobs. Competition is intense.

Seattle—Fabricating shop operations are below normal due to seasonal recession, but large tonnages are involved in projects up for bidding within 60 days. Plants have ample inventories for work in hand.

Tubular Goods . . .

Tubular Goods Prices, Page 126

New York—While in good demand, merchant pipe is a shade less active, due in part to seasonal influences. When quotas were recently set up for the early part of next year, there was little dissatisfaction on the part of distributors. Only in a few instances were there requests for more than the allotted amounts.

Philadelphia—Bids went in Dec. 15 on a large pipe project for Chester, Pa., municipal authority. Should fabricated steel pipe be purchased, more than 20,000 tons will be required.

Los Angeles—Although pressure for pipe deliveries is unabated, with users of 1½-in. and 2-in. especially urgent in their needs, demand from refineries and oil tool manufacturers is extremely sluggish. Over-production and low price of crude continue to discourage facilities expansion, and buying by oil producers generally is limited to maintenance requirements. A major exception is Salt Lake Refining Co., which plans to begin early in March a $10 million expansion program to increase high octane gasoline output of its Utah refinery.

San Francisco—Canadian Bechtel, subsidiary of Bechtel Corp., this city, has been awarded a contract for construction of a 450-mile, 20-inch diameter pipeline from Edmonton to Calgary in Canada. This is the largest section of an 1150-mile line from Edmonton to the Lake Superior region, and will tap the newly developed oil fields near Edmonton.

Seattle—Cast iron pipe demand is exceedingly quiet, agencies expecting no marked upturn until municipalities and other large buyers have worked off excess tonnages. No important projects are up for figures.

Plates . . .

Plate Prices, Page 123

New York—Plate deliveries are a shade more extended, but consumers have little difficulty in getting promises of three to four weeks, especially on heavier gages. Most eastern producers are operating at the highest level since well before the steel strike. The outlook in plates is still far from promising because of the continued lag in most heavy lines.

Philadelphia—Plate business is still nip and tuck with district plate mills. Some are in a slightly better position than they were a couple of weeks ago, but demand, except for the light gages, is sluggish. Mills have difficulty maintaining current operating rate. In certain other areas, demand for plates appears heavier, particularly in relation to the districts' capacities. Some orders have been placed in the East for shipment as far west as Chicago. Pennsylvania Railroad, which recently placed some tonnage for car repairs, has deferred shipments for a couple of months in some instances.

Pittsburgh—Plate fabricators have curtailed operations slightly, but are making progress against order backlogs. Outlook for early next year indicates little change in depressed level of new inquiries.

Birmingham — Plate demand continues reasonably good and shipments are moderately prompt. An anticipated pickup in carbuilding at Bessemer will add measurably to demand for this product.

Los Angeles—Demand has stiffened with jobbers taking January tonnage in heavier volume than anticipated.

Wire . . .

Wire Prices, Page 125

Chicago—One of the largest wire rod users in this area reports one mill's allocation to him will permit only 16 hours of operation a month. In "bonus" tonnage, possibly to be made available later by the same mill, lies this company's hope for satisfying the heavy demands presently upon it. A major wire producer here offers three months delivery on most manufacturers, wire items, spring wire being booked farthest ahead, about four months. Despite this extended delivery, no firm allocation plan is being used. Amount of business taken from individual concerns, however, is subject to scrutiny, the available steel being meted out to the hardest pressed consumers. New and old accounts enjoy about the same consideration. A steel exchange service is being conducted by the National Association of Bedding Mfrs. to enable members to swap.

Birmingham — Wire product demand is spotty here, being influenced a great deal by changing weather conditions. Nail demand holds steady, but that for most fencing items is off. Moderate demand is noted for manufacturers' wire.

Los Angeles — Although requirements of bed spring manufacturers have tapered, wire needs for nails and automobile seats continue strong.

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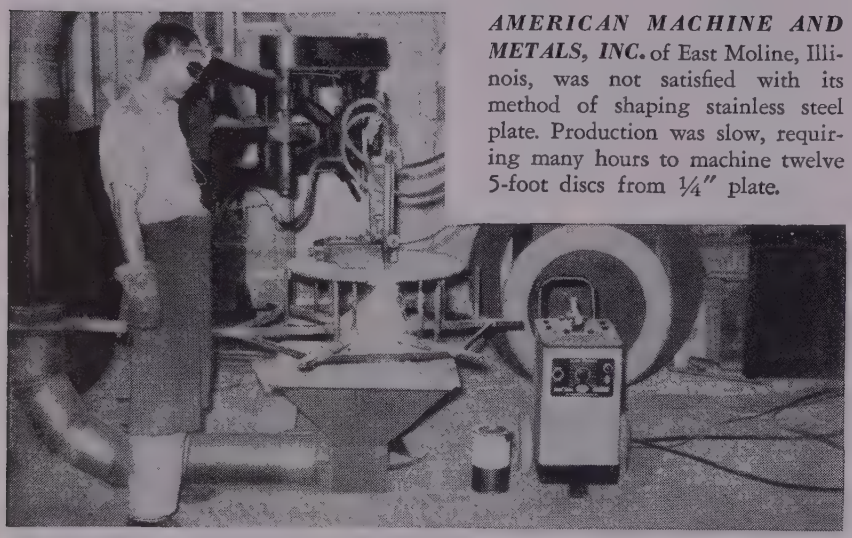
flux-injection cutting of stainless steel saves about four working days



AMERICAN MACHINE AND METALS, INC. of East Moline, Illinois, was not satisfied with its method of shaping stainless steel plate. Production was slow, requiring many hours to machine twelve 5-foot discs from ¼" plate.

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Rails, Cars . . .

Track Material Prices, Page 125

New York—American Car & Foundry Co. has booked an order for 36 passenger cars from the Great Northern Railway. They will be of streamline design and will include baggage-mail cars, baggage dormitory cars, coaches, lounge cars, diners and observation cars. All will be constructed at the St. Charles, Mo plant.

Chicago—An $11 million car program for 1950 has been announced by Chicago, Burlington & Quincy. Included are 1400 steel-sheathed boxcars, 800 all-steel hopper cars and 30 baggage express cars, all to be built in its own shops. Another road is momentarily expected to place orders for 5000 new freight cars, and reinstate a car repair program on 1469 gondolas and reline with steel 1000 additional cars.

Warehouse . . .

Warehouse Prices, Page 127

Philadelphia—Warehouse steel demand has dropped this month and probably will decline further through the holidays. Sheets are virtually the only items in strong demand.

Pittsburgh — Warehouse interests are concerned over disappointing volume of small orders processed daily. Most are in position to make delivery within 48-hours on any product.

Cleveland—Local distributors are rebuilding their strike-depleted inventories fairly rapidly, but some mill deliveries are not coming through as quickly as had been hoped.

Cincinnati—Warehouse demand is fairly active, although considerably below November levels. District supplies were augmented with ending of an eight-weeks strike by employes of Joseph T. Ryerson & Son Inc. Inquiries from those normally served from mills are decreasing.

Chicago—Warehouse demand is only moderate for the products in stock. Very little flat-rolled steel is available and tonnage leave warehouses instantly on receipt. Price changes may take a little time to appear, the full import of last week's announcement requiring considerable time for study. Initially, it would appear that some products may have a wide price range between the various distributors until the market adjusts itself to all the changes.

Los Angeles—Distributor activity continues to recede seasonally. Some customers are out of the market for year end inventory reasons; others are buying on a hand-to-mouth basis. Warehouses are attempting to hold down their stocks, particularly in bars and structurals, although they are placing substantial orders for sheet and strip.

San Francisco—Turnover of stock in most warehouses is slack. Demand is heavy for sheets and strip, but distributors are nearly cleaned out of flat-rolled material.

Seattle—Distributors report a fair turnover despite seasonal conditions, the total equalling November which showed a sharp decline compared with October. Orders, while fewer, are in greater volume. The price tone is firm.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 126

Pittsburgh — Despite fact beehive coke operators are restricted to 3-day work week schedule by UMW, there is no appreciable pressure for beehive foundry coke due primarily to ample supply of oven foundry coke. Foundries report satisfactory coke inventory position at current depressed rate of operations. Some weakness has developed in Connellsville beehive foundry coke prices with range of $15-$16 prevailing, off 50 cents on low side of range.

Pig Iron . . .

Pig Iron Prices, Page 122

New York—District foundries appear in a comfortable position with regard to iron. Shipments are readily available and most foundries are operating on a more or less restricted basis of three to four days a week.

Philadelphia—Foreign pig iron is being offered more freely and at lower prices. Austrian foundry iron has been quoted at around $42, c.i.f. eastern seaboard, but now the market appears still lower. This is indicated by firm offerings of round tonnages of basic at $38, on cars, Philadelphia, about $10 a ton under the domestic market.

Pittsburgh—Merchant iron demand from small jobbing foundries remains light, although some job shops report a slight upturn in activity. Indicative of near capacity ingot operations through early months next year, integrated steel producers have returned largest number of blast furnaces to active duty since close of first quarter.

Cleveland—Merchant pig iron demand is only fair. With the foundries comfortably stocked, no rush to pile additional metal is noted. As an average, foundry operations are estimated at about 55 per cent of capacity and the castings producers are following a cautious policy in ordering materials.

Cincinnati—Ordering of merchant iron lags in this district. The melt is unimproved and some foundries are either on extremely light schedules or closed down.

Chicago—Hot iron supply has about caught up with the requirements of steelmakers; Inland Steel Co. last week switched one stack to malleable for about a month-long run. In recovering from the strike, there was some intercompany trading in cold iron for semifinished until local mills could get their products in balance. Most recent addition to number of furnaces in blast here occurred Dec. 4 with the blowing in of Interlake Iron's "A" stack, to give the district 35 units in operation.

St. Louis—Pig iron demand is holding up satisfactorily at a level below that of a year ago, but considerably better than six months ago. The market is steadily growing more competitive, due to large tonnage being offered here and from outside sources. Some small foundries are continuing a gradual comeback, but the industry here is probably not averaging over 60 per cent of capacity. One of the district's largest steel foundries is doing practically nothing. District coke ovens are al-

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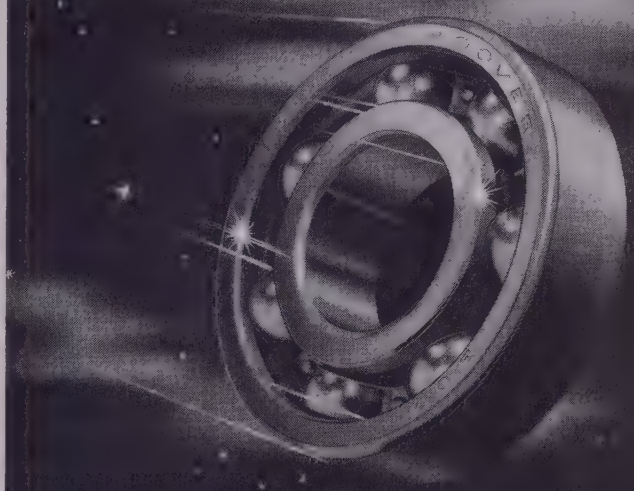
with HONED raceways

As quiet as a night full of stars



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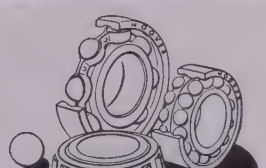

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most back to maximum capacity, with strike scarcities of good coking coal about eliminated.

Birmingham—Pig iron melt is at capacity in merchant furnaces and nearly so in steel mills, only one furnace at Ensley being down. Demand for merchant iron is consistent and widespread, a condition likely to continue well into the new year.

Seattle—For the first time since the war, European pig iron is being offered in this area at an average of $5 per ton less than domestic, the latter being $54.20 delivered here. Two local plants are reported to have placed orders. The country of origin is not stated, the quality being reported better than average.

Scrap . . .

Scrap Prices, Page 130

Philadelphia—Scrap market continues easy, although there are few price changes. Demand is spotty and in some grades, No. 2 bundles in particular, there is little or no movement whatsoever. Cupola cast is lower at $35, delivered; clean auto cast, $37. Electric furnace bundles have been adjusted to $26 compared with $25-$26 recently.

Pittsburgh—Undertone of the scrap market has weakened with steelmaking grades generally $1 lower. Local mills are not buying, due to their comfortable inventory position and their knowledge that substantial supplies are readily available when needed from dealers' and brokers' stocks. Mills' chief sources of supply now appear to be the railroads, direct shipments from plants and yards handling industrial scrap. Based on sales to consumers outside this district, low phos is quoted $30-$31, off $1.

New York—Brokers have reduced buying prices on No. 1 heavy melting steel and No. 1 bundles to $21, f.o.b. shipping point; No. 2 heavy melting and No. 1 busheling to $18-$19; and No. 2 bundles to $17-$18; Punchings and plate scrap, cut structurals and electric furnace bundles to $21-$22. Cast grades are unchanged.

Cincinnati—Buying of scrap has faded, with some mills entirely out of the market. Mills have built good stocks and, being disinterested in further purchasing, have reduced bids. Brokers' and dealers' prices are down on the whole list. Favorable weather has helped to free big volume, dealers have released speculative holdings, and railroad lists have been extensive.

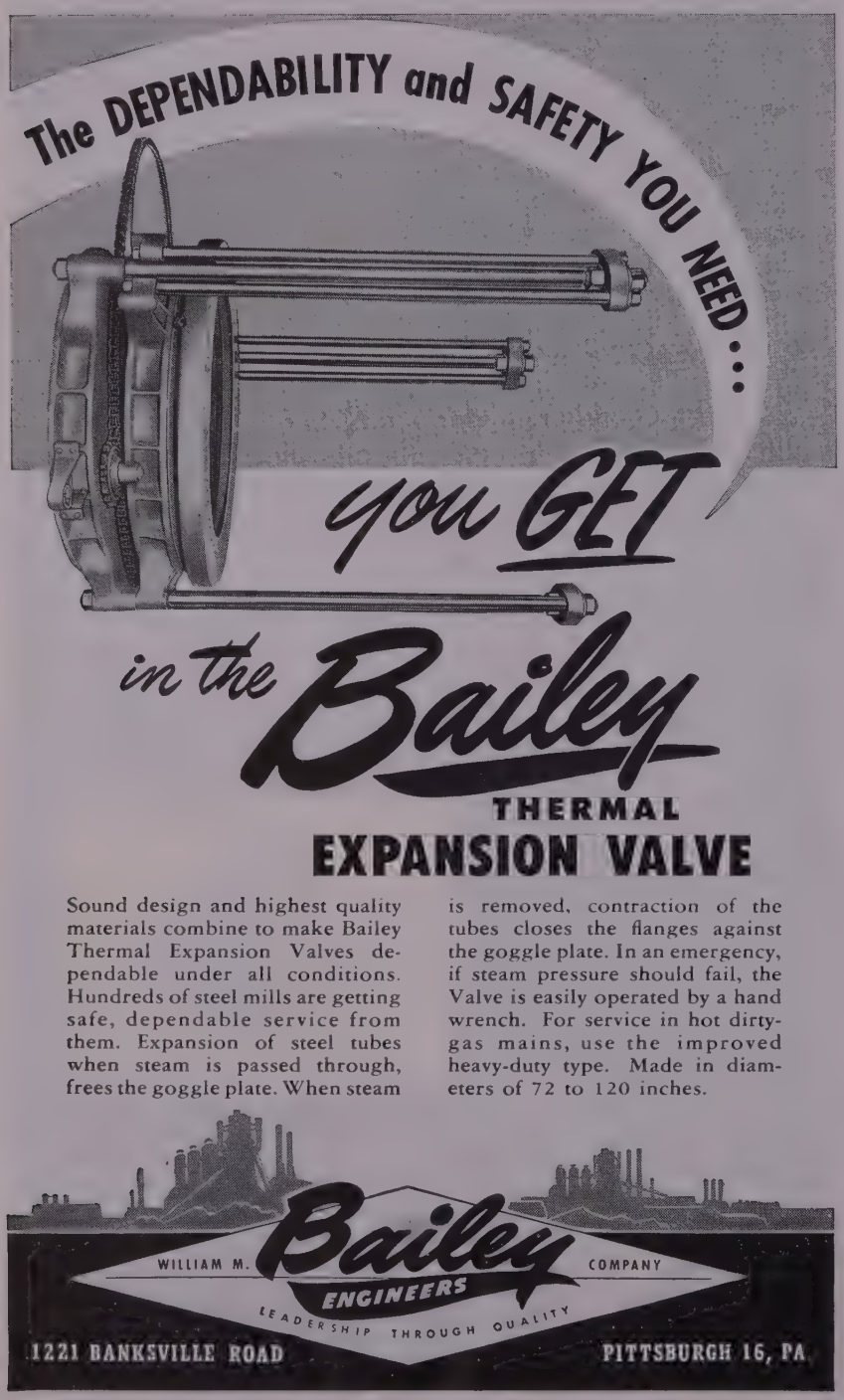
Chicago — Small sales of No. 1 heavy melting steel have been made at both a dollar over and under the quoted range of $28-$30, making the future trend very much in doubt. In the opinion of many traders more scrap is moving at the earmarked price of $30 by one mill than is being bought on open market, even though the quantity taken from the favored companies is extremely limited. Recent reductions in dealers' buying prices have resulted in virtual cessation of scrap flow, but traders say yard stocks are so large now as to make tightness in supply very distant. Prices at which material can be obtained vary widely, widest spread existing in cupola cast which is offered in quantity at $39-$40 with lesser tonnages available down to $35.

St. Louis—Scrap prices softened $1 to $3 last week. Open weather has aided shipments and deliveries have boosted mill stocks to substantial levels. Several railroads have made scrap offerings the last two weeks, but demand pressure for rails, formerly created by poor heavy melting shipments, was gone and prices sagged. The price drop is believed temporary and a rise after the first of the year is forecast. Depending greatly on the weather, Jan. 15 to Mar. 15 normally is period when scrap is hard to get in this district.

Birmingham—Scrap prices remain steady, but observers indicate a weakening tendency, although heavy melting continues to be quoted at $27 and cast grades are relatively high. Yards are pretty well filled.

Los Angeles—Mills are increasingly selective, buying only local material and accepting only top grades. Specialties currently find no takers. With foundries in the doldrums, electric furnace bundles are down $1 per ton to $25; No. 1 cupola cast, down as much as $4 to a range of $28-$30.

Seattle—Scrap sales are small due to the withdrawal of the largest buying interest. Prices are unchanged on basis of $18 for No. 1 and No. 2 heavy melting. Cast iron scrap supplies are ample since foundry operations are below 50 per cent. No. 1 cupola cast has eased $2.50 to $25.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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6090 tons, office building, Aluminum Co. of America, Pittsburgh, to the American Bridge Co., that city.

2000 tons, office building, Sam Minskoff, 60th St. and Madison Ave., New York, to Bethlehem Steel Co.

1380 tons, Public School No. 14, Brooklyn, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

785 tons, Public School No. 175, Queens, New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

625 tons, store and office, Sam Minskoff, Syracuse, N. Y., to Bethlehem Steel Co.

180 tons, plant addition, Sharp & Dohme, West Point, Pa., to Frank M. Weaver, Philadelphia.

150 tons, warehouse, Lyndhurst, N. J., to Elizabeth Iron Works, Elizabeth, N. J.

100 tons for unstated project, to Leckenby Structural Steel Co., Seattle.

STRUCTURAL STEEL PENDING

4000 tons, Massachusetts Life Insurance Co. building, 48th St. and 5th Ave., New York; pending.

2800 tons, veterans hospital, Philadelphia; John McShane, that city, low on general contract.

2500 tons, three apartments, Philadelphia; bids Dec. 29 through Turner Construction Co., that city.

2000 tons, state bridge, Benedict, Md.; bids Dec. 20.

1600 tons, Lookout Point dam overcrossings; bids to U. S. Engineer, Portland, Oreg., Jan. 17.

1100 tons, state bridge, west branch of Elizabeth river, Portsmouth, Va.; bids Dec. 20.

1050 tons, state turnpike bridge, Allegheny and Westmoreland counties, Pennsylvania; bids Jan. 4.

1050 tons, stock house, Brooklyn, N. Y., for Schlitz Brewery, Milwaukee; pending.

1000 tons or more, addition to Frederick & Nelson department store, Seattle; bids Dec. 20.

800 tons, bascule bridge McNary dam ship canal; bids to U. S. Engineer, Walla Walla, Wash., Jan. 16.

400 tons, warehouse, Owens-Illinois Glass Co., Fairmount, W. Va.; pending.

350 tons, state turnpike bridge, Westmoreland county, Pennsylvania; bids Jan. 4.

300 tons, veterans hospital, Connecticut; bids Jan. 4.

225 tons, Weber Wasteway, Columbia Basin project; bids to Bureau of Reclamation, Denver, about Dec. 23.

200 tons, repairs, engine house, Pennsylvania Railroad, Columbus, O.; pending.

160 tons, state general hospital, Wayne county, Pennsylvania; bids Dec. 21.

150 tons, transmitter station, naval project near Arlington, Wash.; bids in.

100 tons, also 75 tons reinforcing, relocation of Spokane, Portland & Seattle Railway, McNary dam project; Morrison-Knudsen Co., Seattle, apparently low, $3,275,224.

100 tons, round house repairs, Pennsylvania Railroad, Crestline, O.; pending.

Unstated, two 350-ton and one 10-ton travelling cranes for McNary dam locks; bids to U. S. Engineer, Walla Walla, Wash., Feb. 2.

REINFORCING BARS . . .

REINFORCING BARS PLACED

8500 tons, Oregon side McNary dam, to Northwest Steel Rolling Mills Inc., Seattle.

500 tons, riprap project Columbia river near Coulee, to Bethlehem Pacific Coast Steel Corp., Seattle; Morrison-Knudsen Co., Seattle, general contract.

REINFORCING BARS PENDING

5340 tons, apartment, Lake Shore drive, Chicago; bids asked.

750 tons, Weber wasteway, East low canal, Columbia Basin project; bids to Bureau of Reclamation, Denver, about Dec. 23.

720 tons, Allan county War Memorial Coliseum, Ft. Wayne, Ind.; bids asked.

320 tons, apartment, 860 Lake Shore drive, Chicago; bids asked.

313 tons, High bridge, Cook county, Illinois; bids asked.

145 tons, Levies, Cairo, Ill.; bids asked.

130 tons, Illinois National Guard Armory, Bloomington, Ill.; bids asked.

126 tons, Hess Park grade school, Decatur, Ill.; bids asked.

110 tons, bridge, Octonagon county, Michigan; bids asked.

105 tons, Racine street bridge, Menash, Wis.; bids asked.

Unstated, feline house, Seattle Park department, $240,000 project; bids asked Dec. 20.

Unstated, bear grotto, Seattle Park department; project; Fiksdal & Ness, Seattle, low, $242,-435.

Unstated, 1300-foot snowshed project; bids to state highway department, Olympia, Wash., in January.

Unstated, Washington state bridge, Skagit county; general award to Northwest Construction Co., Seattle.

PIPE . . .

CAST IRON PIPE PLACED

130 tons, various sizes, reported awarded to Pacific States Cast Iron Pipe Co., Portland, Oreg., by Aberdeen, Wash.

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Canadian National, eight 1500-horsepower

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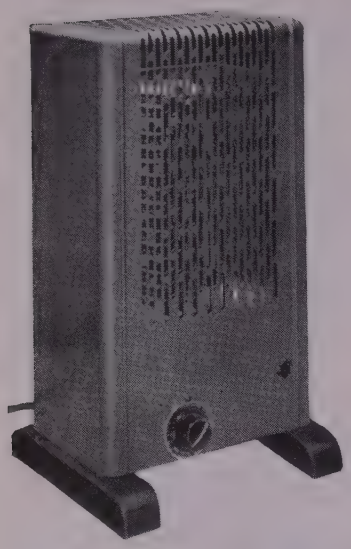

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diesel-electric road units, to Montreal Locomotive Works, Montreal, Canada.

Missouri-Kansas-Texas, 17 diesel-electric units, awarded as follows: Nine 1500-horsepower switching units and four 2250-horsepower passenger units to the Electro-Motive Division, General Motors Corp., La Grange, Ill.; three 600-horsepower switching units to the American Locomotive Co., New York; and one 1600-horsepower switching unit to Fairbanks-Morse Co., Chicago.

Pennsylvania-Reading Sea Shore Lines, six 1500-horsepower diesel-electric units for freight and passenger service, to Baldwin Locomotive Works, Eddystone, Pa.

Texas & Pacific, seven 1500-horsepower diesel-electric switching units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Great Northern, 36 passenger cars, to American Car & Foundry Co., with construction at its St. Charles, Mo., plant; the list comprises six types of cars: baggage-mail, baggage-dormitory, coach, coffee-shop-lounge, diner and observation lounge, six cars of each design.

CONSTRUCTION AND ENTERPRISE

MISSOURI

LINN, MO.—Central Electric Power Corp. has REA approval for a 15,000 kw steam generating plant, 132 miles of 154 kv transmission line and 233 miles of 69 kv transmission line, Missouri 71A, Moniteau; cost $11,350,000.

OHIO

STEUBENVILLE, O.—Superior Sheet Steel Co. has been incorporated by Jack N. Berkman, 708 Sinclair Bldg., Louis Berkman and Carl A. Weinman to manufacture and deal in iron, steel, alloys and all kinds of metals and hardware products.

OREGON

HERMISTON, OREG.—R. M. Brown, U. S. resident engineer, will call bids about Jan. 1 for construction of rail connections between Hinkle and Juniper, Oreg., and for railroad terminals at Hinkle involving 17 miles main track and 25 miles yard track, also several structures and overpasses. Buildings include yard offices, power house, engine house stockyards, car repair and fueling facilities.

SALEM, OREG.—Construction of a proposed five-story headquarters building for the Oregon Highway Commission has been awarded Sound Construction & Engineering Co., Seattle, low at $1,599,931. The project involves 400 tons reinforcing.

PENNSYLVANIA

ERIE, PA.—Trost Sheet Metal Works Inc. has been incorporated through Jackson D. Magenau, attorney, 1209 G. Daniel Baldwin Bldg. The firm will operate a roofing and sheet metal shop and process and fabricate sheet metal and other metal products.

SOUTH CAROLINA

WILLIAMSTON, S. C.—Textron Inc., Royal Little, president, Anderson, S. C., has let a contract to Daniel Construction Co., 429 N. Main, Greenville, S. C., for a filament rayon weaving plant, cost approximately $4 million. Installation of machinery will start next April.

TEXAS

DALLAS—Securities and Exchange Commission, Washington, granted Texas Utilities Co. authority to make loans amounting to $15 million to its subsidiaries, Texas Electric Service Co., Fort Worth, Tex., and Texas Power & Light Co., Dallas; loans to be used for construction purposes.

FREEPORT, TEX.—Dow Chemical Co., Dr. A.

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up to 145" diameter

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P. Beutel, general manager, will release plans for bids about Feb. 1, 1950, for superstructure for an ammonia plant, cost approximately $5 million; foundation work let to Austin Co., M & M Bldg., Houston.

ORANGE, TEX.—Consolidated Western Steel Corp., Alden G. Roach, Los Angeles, president, announced decision to construct the $5 million large-diameter pipe mill planned for Houston, at Orange instead. The plant, to be built on the acquired government-built shipyard property, will have an output of 100,000 net tons of 24-inch or larger electric welded and expanded steel pipe for use in long distance oil and gas pipe lines.

WASHINGTON

BELLINGHAM, WASH.—Puget Sound Pulp & Timber Co. announces a $1,250,000 program for installation of chemical cleaning unit for improved grade of pulp production.

EAST WENATCHEE, WASH. — City opened bids Dec. 5 for proposed 300,000-gallon concrete water storage reservoir.

KITTITAS, WASH.—James M. Kay Jr., town clerk, will receive bids Dec. 12 for construction of treatment plant, a unit of city's proposed $150,000 sewer system project.

SEATTLE—Western Electric Construction Co., Portland, Oreg., is low $140,000 to U. S. Navy for construction of substation near Arlington, Wash., a unit of proposed $10 million communications center.

WISCONSIN

SUPERIOR, WIS.—Contracts for the three sections of the Edmonton, Alta., to Superior pipeline have been let, and the Superior division, from Gretna, Man. to Superior, will be constructed by Anderson Bros. Corp., Houston.

CANADA

EDMONTON, ALTA.—J. M. Pritchard, president, McColl-Frontenac Oil Co. Ltd., announces plans for early construction of a $10 million refinery. British American Oil Co. is also reported to be planning to increase its refining capacity soon.

HAMILTON, ONT. — Plans have been announced for a $2.5 million construction program at McMaster University. The program calls for three buildings.

TORONTO, ONT.—Pilkington Bros. Ltd. will construct a $3 million pant on the outskirts of Toronto for production of plate glass.

TORONTO, ONT.—International Business Machines Co. will erect a $1 million plant in the Toronto area, with construction scheduled to start soon.

FERROALLOYS

(*Continued from Page 127*)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c., f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

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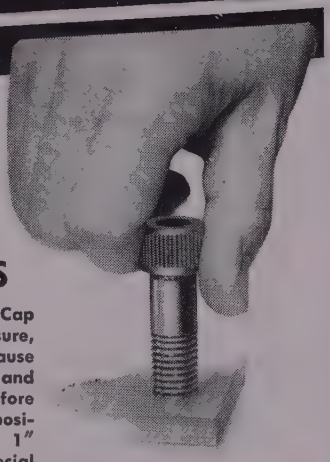

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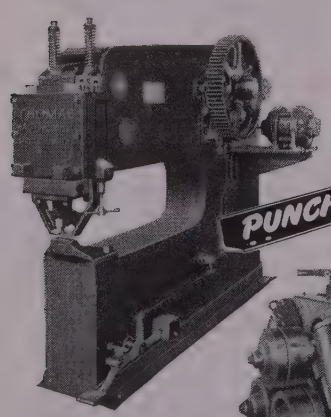

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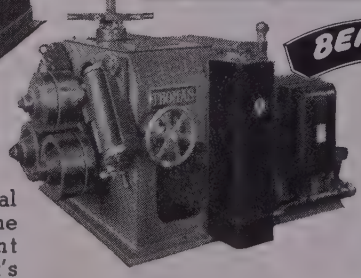

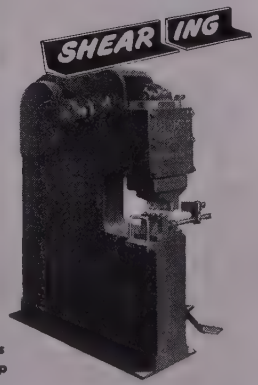

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50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.00c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l., lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo. each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%. Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%. Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. Crucible-Special

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REPRESENTATIVES AND WAREHOUSES IN PRACTICALLY ALL PRINCIPAL CITIES

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SAMSON STEEL SHOT
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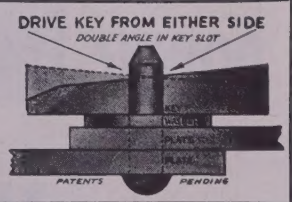

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Air Dump Cars, Mine Cars, Locomotives, Lorries AXLESS Trains and Complete Haulage Systems

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Machines for 1/16" to 3/4" Rod. Rounds and Shapes.

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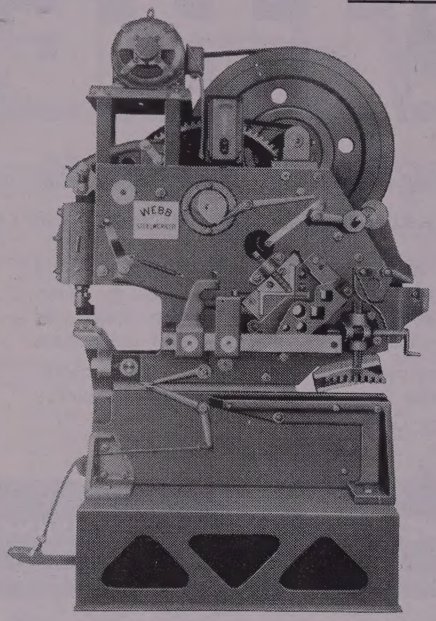
Combination Shear, Punch, and Coper
5 Complete Tools in a Single Unit



1 Punch for plate, bars or structurals.
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For diversified shop work or high production output, this all-purpose machine is always in complete readiness to do any of above operations.

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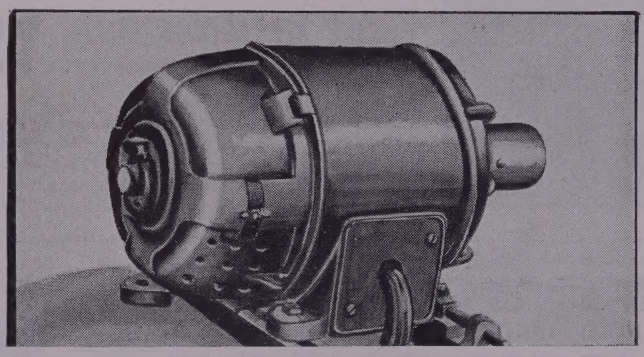

change to **NON-FLUID OIL**
TRADE MARK REGISTERED

With its exclusive adhesive properties, NON-FLUID OIL does not creep or throw onto armatures to cause burnt-out windings from oil-soaked insulation. Motors run cooler and stoppages are reduced to an absolute minimum. You save on oil bills too because NON-FLUID OIL lubricates until entirely used up outlasting ordinary lubricants 3 to 5 times.

Write for Bulletin No. 504ST and free testing sample of NON-FLUID OIL.

NEW YORK & NEW JERSEY LUBRICANT CO.
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WORKS: Newark, N. J.
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NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

Grades (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8% Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed. 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

This hose resists water absorption—lasts up to 100% longer

"Wet strength" cord adds years of life to B.F. Goodrich water hose

B. F. GOODRICH water hose is made with rubber compounds that make it highly resistant to water absorption, swelling, carcass damage.

In accelerated laboratory tests B. F. Goodrich water hose absorbed less than half as much water as other brands tested. This means longer hose life, because water can diffuse through to the carcass to cause mildew and mold.

All types of B. F. Goodrich water hose have this longer-lived compound. And all types have "wet strength" cord —specially treated long-staple cotton that actually becomes *stronger* when wetted (where synthetic fibers weaken).

Tubes—All grades and types of B. F. Goodrich water hose are fortified with Agerite, the chemical that makes rubber last longer. Most BFG water hose stands hot water; some—creamery hose for example—even take low pressure steam. Specially compounded tubes available to stand water contaminated with acids and other chemicals.

Covers—You can drag B. F. Goodrich water hose over wet concrete floors, dirt and cinder yards, use it on highways where it gets run over. It's compounded to take severe abrasion, to resist cutting and gouging. Some covers are compounded to stand oils and greases. Can be made with rubber-capped ends, that protect the carcass from moisture wicking in. Built-in nozzles and tapered ends can be dropped anywhere without doing damage.

If you use water hose **don't** be satisfied without knowing what developments BFG may have made in hose for your particular type of service. To make sure you get the longest life from water hose, see your local BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Water Hose BY
B.F. Goodrich

Behind the Scenes . . .

Dated Up

We've been getting in our annual supply of calendars. And very welcome they are. Those we can't use ourselves we pass around. American business names are well represented on the walls of STEEL's editorial and business offices.

We like great big calendars with space to write on. All during 1949 we reveled in the spacious job put out by Mesta Machine Co. For the month of December we had enough room to write "Wife—gift for . . . Dentist . . . Get blank checks from bank . . . Write Aunt Myrtle . . ." and several other items, including "Appointment with Grace." That one has us stumped. Our wife's name is not Grace, and we had no appointment with Mr. Grace of Bethlehem Steel Co.

For 1950 we'll be using a big General Electric Co. calendar. The boss next door has Mesta's new issue.

We are wondering if many advertising managers have the calendar problem which one chap we know had. For years he got a request scrawled on a postcard, "Please send 10 calendars for my office walls." He sent them for a while until he got into a chat with another adman. They discovered they both were getting the identical request. A check revealed that several other companies were also being dunned. They all suspect, but they've never been able to prove, that the postcard character was a wastepaper dealer.

Coming Attraction: Yearbook

Well, it won't be long now until our 1950 Metalworking Yearbook is in your hands. Next week, you'll get in one package: Statistics of the metalworking industry, business prospects for 1950, a chronology of the big economic news events of 1949, a forum on what's happening and what's likely to happen on the technical side of industry and a calendar of all the major metalworking conventions and shows thus far scheduled for next year. In addition to all this, you'll get our regular market service.

A Backward Glance

This being the 52nd and last issue of the year, perhaps we should look back over our shoulder and see what's been cooking, before we plunge on into the second half of the 20th century.

Of course, you've just been reading one copy each week and probably don't realize that over a million copies of STEEL have been trucked from the Penton Building up to the Cleveland Post Office this year. That means that Dave Shackleford, who for many years has seen to it that the mail bags are safely delivered to the boys on the platform in time to catch the proper trains, has wrestled with over 500 tons of paper and has the muscles to show it. STEEL uses only one staple in binding, but even so we've chewed up something over 30 miles of wire this year and Lord knows how much glue. Enough at least to account for a few nags who gave up the ghost in 1949.

But that's all peanuts compared to the human energy that's been transformed into the printed pages you've been reading these past Mondays. Well over 60,000 editorial man hours go into the more than 3500 editorial pages which have been delivered to you, and that's not counting even a minute of our precious time devoted to this so-called page. Then, of course, you've had practically five thousand pages of advertising come your way and every one of them represents hours of time spent by agency men and advertising managers in development and production.

The pay-off, however, is the profitable time that you and your fellow readers have spent with these issues. At first we didn't believe it, but it actually works out that a conservative estimate would be something over 2,500,000 hours have been spent reading STEEL in the last twelve months. Most all of that has been during working hours and it represents the time of management men, purchasing officials, production and engineering executives whose time is worth quite a few pesos per hour. Figure out for yourself the investment they are making in keeping well informed and you'll appreciate the pride we have in the job the editors of STEEL are doing and realize the challenge of constantly improving and perfecting this business tool which we call the magazine STEEL.

Shrdlu

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STEEL

Vol. 125—No. 26 December 26, 1949

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